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STATE GUIDES FOR ASSESSING FOREST LAND AND TIMBER, 1977

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## PREFACE

This publication is the fourth in a series prepared by the USDA Forest Service.<sup>1</sup> This material should benefit State and local tax officials, assessing officers in particular; individual forest owners; representatives of forest industry; and others having an interest in property tax questions.<sup>2</sup> The exchange of ideas in the assessment field should also enable States to benefit from the experience of others and, hopefully, lead to improved assessment administration.

This publication summarizes the procedures used throughout the Nation for assessing forest land and timber subject to the general property tax. Material is included for States that tax either forest land or timber, on the basis of their value. Timber exemptions, yield taxes, or other special forest tax laws will not be treated.<sup>3</sup> Assessment guides are included for those States that publish such information. Statutory provisions are included where appropriate.

The material for this publication was provided through the cooperation of State tax officials for all 50 states and is current as of December 31, 1976. Their data have been edited and condensed. Summaries have been reviewed by appropriate State tax officials. Their contribution is gratefully acknowledged, for without it, this work would not have been possible.

Precedents established by Ellis T. Williams, in the 1966 edition of this publication with respect to intent, coverage, and format were followed; some new ideas are also included. In some cases where State assessment procedures have remained the same since 1966, the material included in the previous publication has been reproduced here. Williams' contribution is gratefully acknowledged.

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<sup>1</sup>Nelson, Alf. Z. Status of official instructions for assessing forest land. Forest Taxation Inquiry. USDA Forest Service, 28 pp. 1941 (Out of print). The second compilation was prepared by Ellis T. Williams, State guides for assessing forest land and timber--1955. USDA Forest Service, 52 pp. 1956 (Out of print). He prepared a third compilation under the same title (1961 date), Misc. Publ. 1061. 91 pp. 1967 (Out of print).

<sup>2</sup>Summaries are not intended to substitute for the actual assessment guides. Specific questions about the applicability of particular assessment rules should be referred to your local tax assessor, State tax commissioner or Department of Revenue.

<sup>3</sup>For such provisions see: Ellis T. Williams, State forest tax law digest--1967. (Forest Service, USDA Misc. Publ. 1068, 1968), 56 pp. or Timber Tax Journal, Vols. 8, 9, 10, and 11 (Wash., DC: Forest Industries Committee on Timber Valuation and Taxation).



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**ALABAMA<sup>1</sup>**

Standing timber is exempt from property taxation. Forest land subject to the property tax is assessed on its fair and reasonable market value. This is determined by the local assessor from information entered on the tax return and other available information.

**ALASKA**

Alaska has no instructions for assessing forest properties.

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<sup>1</sup>State Department of Revenue. 1977. Ad Valorem Tax Division, Montgomery. Personal correspondence.

## ARIZONA

For ad valorem tax purposes, all property within the State is placed into one of six major classes.<sup>2</sup> All taxable property is appraised at its full cash value and assessed at some percentage of this appraised value. The statutory assessment percentage differs for each of the six classes; class 1, which includes standing timber, is assessed at 60 percent of full cash value.<sup>3</sup>

Standing timber is appraised at the local level with guidelines supplied by the Arizona Department of Revenue.<sup>4</sup> An edited version of this guide appears below. These guidelines outline two phases of appraisal: (1) unit value determination and (2) collection of physical data.

Guide to Appraisal of Standing Timber in ArizonaUnit Value DeterminationNature of Resource

Ponderosa pine (Pinus ponderosa), the major commercial timber species in Arizona, is the only one treated in this guide. Because of the relatively limited market for pulpwood in the State, only sawtimber-size trees are considered. Furthermore, because timber value growth rates are low in Arizona, private ownerships of less than 40 acres are considered too small to represent properties held for forest production. Therefore, only ownerships of more than 40 acres that contain open land must have at least 10 forested acres.

Market Value Approach to Valuation

Although private timber is rarely sold in Arizona, large quantities of public timber are sold, generally at a price determined by the residual approach to valuation. If it can be assumed that private timber has approximately the same value as nearby public timber, then the price data available from the National Forests can be used to determine private stumpage values. This assumption may or may not be valid, but it

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<sup>2</sup>42-136, Arizona Revised Statutes.

<sup>3</sup>42-227, Arizona Revised Statutes.

<sup>4</sup>The appraisal guidelines are a result of a 1972 study performed by W. P. Thompson, O. C. Minor, and the Department of Revenue. Thompson and Minor are Associate Professor and Dean, respectively, of the Northern Arizona University School of Forestry.

is generally believed that the Forest Service prices are rather conservative; the occasional private sale typically brings a higher price than Forest Service timber.

Each year the Forest Service Regional Office in Albuquerque publishes the prices of timber sold in each of the National Forests in the Region. These data indicate that Arizona could be split into three regions, within each of which timber values have been constant. These regions are: (1) Navajo, Apache, and Greenlee counties, (2) Coconino county, (3) all other counties in the State. Timber values in the first region were determined from sales on the Apache and Sitgreaves National Forests; in the second, from the Coconino and Kaibab National Forests; and the third from the Prescott and Tonto National Forests.

These Forest Service stumpage sale prices should closely approximate the value of standing timber on private land in the same area. The full cash value, per thousand board feet, will be ascertained by the Department of Property Valuation, and submitted to the assessor's office.

#### Discounting of Timber Values Approach

Ponderosa pine timber is generally not clearcut in one sale, but is cut in a series of operations, usually spaced many years apart. For this reason, the existing standing timber on a property could be thought of as representing several potential future incomes, each of which should logically be discounted to the present time.

The discount factor, (using an 8 percent interest rate) was applied on an estimated 20-year increment. The factor is .2145.

Example: 1966 inventory--365,000 board feet.

$$\begin{array}{r} 365 \text{ MBF} \times \$29.10/\text{MBF} = \$10,622 \\ \times .2145 \\ \hline \$ 2,278 \text{ full cash value} \end{array}$$

#### Collection of Physical Data

Regardless of the final approach to unit value, the quantity of physical units must be determined by the appraiser. Information will be needed on timber volume, land area, and topography. The timber inventory should reasonably estimate actual volumes of standing timber, utilize practical, low-cost methods, and be capable of being carried out in a short time by relatively inexperienced workers. This requires maximum use of the latest inventory techniques, including aerial photo interpretation, point sampling, and simplified (volume-basal area ratios) computation of volumes.

## Preliminary Operations

Commercial timber location.--Determine the general location of all potential timberland from existing forest maps, primarily those of the USDA Forest Service and Bureau of Land Management. Once established, these locations will not change appreciably for many years.

First parcel check.--Secure all "books" of maps within the commercial timber area. Check parcels for location within the commercial timber zone, and eliminate or retain them on this basis.

Second parcel check.--Plot the location of each parcel on aerial photographs. A trained photo-interpreter should stereoscopically examine each parcel for evaluation of timbered area, commercial stands, topography, and access. Eliminate further tracts as non-commercial. Determine a rough, timbered-acreage figure for use in sample-intensity calculation.

Sample size and allocation.--In view of the relatively low value of southwestern ponderosa pine, an extensive survey is planned. Sampling intensity is calculated on the basis of approximately  $\pm$  15 percent sampling error for the type of timber expected. From these calculations guides are adopted:

<u>Size of tract (acres)</u>	<u>Minimum number of samples</u>
1 to 160	10
161 and larger	20

These minimum sample sizes are to be considered only as a guide.

Sample allocation shall require as nearly as possible a square spacing of samples in an unbiased manner. If the timbered area to be inventoried is extremely irregular in shape, the square spacing will have to be abandoned and samples allocated on a strict area basis.

Preparation of forms.--Complete a tally sheet for each retained parcel in the timbered zone. Give careful attention to accurate identification by book, map, parcel, and legal description.

## Field Collection of Data

Identification of parcels.--In much of Arizona the original Public Land Survey corners are plainly marked and may be located on maps and aerial photos, and the scaling distances and directions from known points. Also, the "cruiser" must watch for boundary markers and location tags along roads and fences. With regard to past cutting methods, unless conditions differ drastically, sampling will tend to give reasonable answers without exact boundary locations.

Sample location.--Determine the sample location in terms of the size and shape of the timbered area. Tentatively locate samples on the aerial photograph using the prescribed sample size and allocation. Taking into account the timber sequence, determine the actual sample position on the ground using a hand compass, pacing, and reference to aerial photos.

Cruising method.--Use the "point-sampling" or "variable plot radius" cruising method. An angle giving 10 square feet of basal area (cross-sectional area) per acre per tree chosen has been found to be enough for sawtimber of the size and density normally found in Arizona. Project this angle (or factor) by using an angle-gauge, or a glass wedge-prism ground to result in an exact diopter displacement.

Field tally.--At a sample point the cruiser revolves the angle-gauge, selecting trees of sawtimber size, 11.6 inches d.b.h. and larger, to be included in the sample. Each selected tree is tallied by the number of 16-foot logs from the stump to a merchantable height, determined as follows:

<u>Tree d.b.h.</u>	<u>Merchantable top diameter</u>
-----inches-----	
12 to 20	8
21 to 30	10
31 +	12

At every other sample point, or more often in irregular stands, measure the merchantable height of at least one sample tree with a clinometer or Abney hand level. Measure the distance to the tree with a cloth tape and record the merchantable height to the nearest foot. Convert it to the number of 16-foot logs. Check tree diameter on doubtful trees, those near 11.6 inches d.b.h.

Borderline trees, as seen by prism or angle-gauge, shall be handled by including every other tree so encountered. An occasional borderline tree should be checked for selection by measuring the diameter and distance and applying the proper horizontal-distance-factor.

Complete the tally sheet while on the parcel with careful identification, including the date and the cruiser's name. Make notes of topography, accessibility, timbered area, recent cutting, or any unusual circumstances while on the ground.

Mapping.--As the inventory is conducted, the property is mapped, showing the timbered areas, roads, canyons, ridges, and streams, indicating any inaccessible areas. Carefully plot the actual timbered area (standing sawtimber) on the aerial photo to show any changes since the photo was taken. Carefully transfer this information to the tally sheet for subsequent area checking.

### Determination of Timbered Area

At the time of the field inventory, map each property directly on the photo. Transfer this information to the tally sheet at a convenient scale. Actual merchantable timber area as seen on the ground and from the photo is plotted on the tally sheet. Also shown are roads, canyons, ridges, streams, and inaccessible areas.

Determine the net timbered area by using a polar planimeter, tracing the boundaries three times and computing an average area in square inches. The area is then converted to acres according to the scale at which plotted. The timbered acreage is entered directly on the back of the tally sheet.

### Calculation of Volume

In Arizona, the Scribner Decimal C log rule is normally used to determine sawtimber volume in board feet. Accordingly, apply conversion factors, or ratios, of board feet (Scribner) per square foot of basal area to the field tally to calculate the sawtimber volume.

With trees tallied by 16-foot logs with a 10 BAF angle-gauge or prism, the total number of logs multiplied by 500 will give volume in board feet. As a check on calculations, total the number of logs both horizontally (by sample number) and vertically (by height) on the tally sheet. The grand total of logs tallied times 500 equals board foot volume tallied. This figure is in turn divided by the number of sample points established in that parcel (normally 10 to 20) to give volume per acre, which is entered on the tally sheet.

### Final Tally Sheet Preparation

Earlier calculations are used at this point. Multiply the volume in board feet (Scribner) per acre by the timbered acreage to determine the total volume of standing sawtimber on the parcel. Put this total on the bottom of the tally sheet.

### Conversion of Volume to Value

For conversion of volume to value, it is necessary only to determine an average stumpage price for the locality, and multiply the total volume by the selling price.

## ARKANSAS<sup>5</sup>

### Commercial Forest Land

#### Definitions

Commercial forest land.--All land not classed as agricultural, urban or "rurban," bearing or capable of bearing forest growths of potential commercial use.

Noncommercial forest land.--Land from which the original forest has been removed, partly or totally, and not used for agriculture, urban or "rurban" purposes.

1. The types of land in this classification include those variously known as wild land, swamp land, etc.
2. Uses for this type land are for purposes varying from limited grazing in fringe farming acres, natural and planned reforestation, hunting and allied recreational activities, to no use whatever for certain barren or isolated areas. Some areas are used for runoff and erosion control in developed watersheds, and some of it is a mere overburden on known mineral deposits.

#### Forest Regions

Arkansas is divided into four distinct forest regions, based on dominant forest species and physiography (figures 1 and 2). Each of these regions has a predominant forest type, land class, and related soils.

Though the four forest regions of Arkansas are defined both by related soils and forest types, boundaries defining these areas are drawn along county lines to maintain county integrity, in computing total land acreage, production, etc. Because of county line boundaries, two or more regional timber types may fall in one county, such as Pulaski County in the Ouachita Mountain Region, but timber of all regions grows there. The four regions are:

1. Coastal Plain	3. Ozark
2. Ouachita	4. Delta

See figure 3 for a map of Arkansas forest regions drawn along county lines. Exhibit 1 lists the characteristics of the different forest regions. See page 17.

<sup>5</sup>The material included is from the Commercial Forest Land Appraisal Schedule. Arkansas Public Service Commission. 22 pp.



Figure 1.--Arkansas forest regions

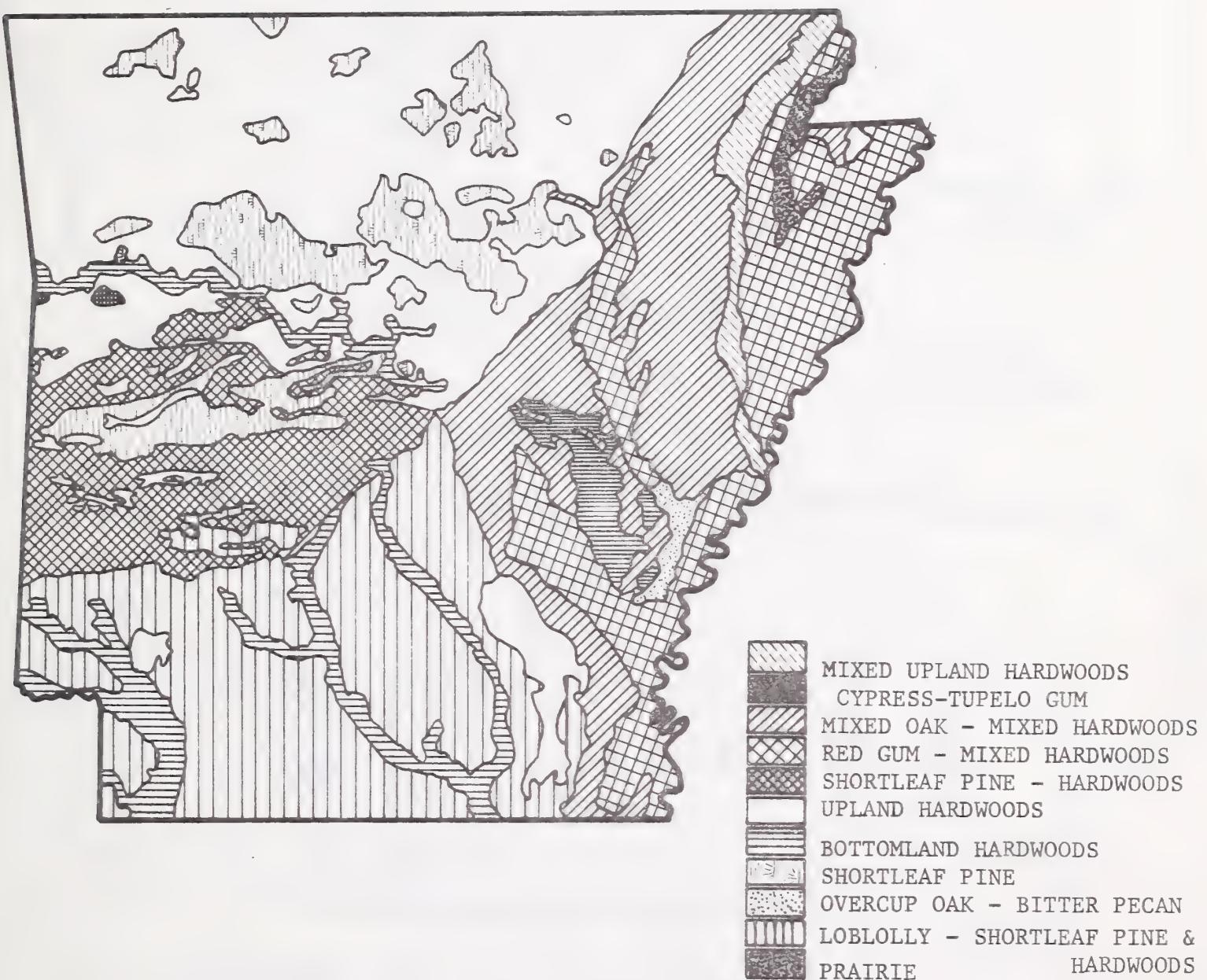


Figure 2.--Arkansas forest type map



Figure 3.--Arkansas forest regions drawn along county lines

### Classification of Land

To assign values to base soil, four land classes are applied to the State as a whole:

Coastal plain pine land.--All the upland soils of the Coastal Plains Region are potential pine-growing soils despite the presence of hardwoods. Soil capability is based on potential pine yields.

Mountain pine land.-- Most of the Ouachita Region and the pine sites in the Ozark Region are included. The upland hardwood types of the Ouachita Region are potential pine sites. In the Ozark Region, the presence of pine indicates the capability of the site for pine and, as a general rule, the south and west slopes of the Ozarks are best adapted for pine.

Bottomland hardwood lands.--The most extensive land class which includes the six forest types of the Delta Region and bottomlands of the other regions.

Mountain hardwood lands.--Primarily the Ozark Region and the upland hardwood type.

### Timber Stand Conditions

Stand timber will be classified into stand size and types as follows:

#### Pine

Sawtimber.--Stands with the dominant trees 10 inches diameter at breast height (d.b.h.) and over, merchantable heights tallied in 1/2 log lengths. The merchantable top will be that point on the stem at which merchantability for sawtimber is limited by large branches, deformity, etc., but will be in no instance less than 8 inches in diameter.

Pulpwood.--Stands with the dominant trees ranging from 5 through 9 inches d.b.h. Field pine, poor grade, very low, thick branches, will be classified as pulp regardless of d.b.h. Height, straightness and grade in the pulpwood sizes will point out piling and post types.

Reproduction.--Reproduction will be considered as pine growth from seedlings to stems up to 4 inches in diameter.

Seed trees.--Cutover timber lands that have three to five trees per acre left for reseeding.

### Mixed Pine and Hardwood

Mixed pines and hardwoods are classified as:

1. Heavy stand of mixed pine and hardwoods on bottomland, growing on a pine site.
2. Average stand of mixed pine and hardwood on upland, growing on a pine site.
3. Average stand mixed hardwood on upland or mountains, growing on a hardwood site.

### Hardwood

Sawtimber.--Stands with the dominant trees ranging from 12 inches d.b.h. and up. Top merchantability is determined by large branches, deformity, etc., but will never be less than 10 inches in diameter.

Pole stands.--Well-stocked, high grade, pole stands free of fire damage, spacing of desirable tree species, at least 12 by 12 feet.

### Cutover Land

This is a minimum valuation class for each class of timber.

### Evaluation

Cutover land.--The cutover area of Arkansas embraces most of the Ozark Region and portions of the other three regions. The value of this property varies greatly from one region to another and few parcels within a given area are of the same value. Cutover land has value deriving from considerations other than forest reproduction. The natural cover is usually a direct indication of basic land capability and possible use, the cover must be considered at all times. The reproduction, therefore, always is an integral part of the consideration in determining value. Many factors are involved in establishing the value of any given parcel. Sales of cutover land in any area are comparatively limited. Some sales do not fairly reflect market value.

Steps.--Cutover and forest land is assessed as follows:

1. Determine the type or class of land.
2. Determine the type and class of cover.
3. Determine its present use.

4. Establish land value by comparison with similar properties of known value.
5. If timber is present in commercial quantities, consider it separately and add appropriate values to the parcel.

Appraisal.--Forest lands are appraised by the same method as used for cutover land. The value of the forest product is added to the basic value of the land. The basic value of land will vary from \$2.50 per acre on the poorer soils to \$20 per acre on the more productive soils. This, of course, is assuming that no other uses exist other than timber. The most important step is to determine the amount of merchantable forest products on the land.

Timber classes.--See table 1 for description of timber class with basic valuation prices by region.

### Timber Cruising

#### Definition

Timber cruising is the art of estimating the volume of timber stands. It is essentially a sampling process, either mechanical or random:

1. Mechanical sampling employs a systematic and orderly method on each parcel of land.
2. Random sampling employs plots through a stand by some random process.

Line plot cruise.--A 10-percent, line plot cruise is recommended on each tract, using 1/5-acre circular plots (52.66-foot radius) for sawtimber. For pulpwood, a 5-percent, line plot cruise is recommended, using 1/10-acre circular plots (37.24-foot radius), the same plot center as used for sawtimber.

Figure 4 shows a line plot cruise plan of a 40-acre tract for 10 percent cruise using 1/5-acre plots. Exhibit 2 is a method of random cruising.<sup>6</sup>

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<sup>6</sup>Exhibits 2, 5, 6, 7, and 8 are not reproduced here; they are found in the Commercial Forest Appraisal Schedule, Arkansas Public Service Commission. 22 pp.

Table 1.--Description of timber classes with basic valuation prices by region<sup>1</sup>

Classification	Stand size <sup>2</sup>	Region value			
		Coastal Plain	Ouachita	Ozark	Delta
<b>Sawtimber: pine</b>					
A1	Pine land with 6-10 MBF per acre	100	80	70	100
A2	Pine land with 3-6 MBF per acre	80	65	55	80
A3	Pine land with 1-3 MBF per acre	60	50	40	60
ST	Clear cut pine land except 3-5 seed trees per acre	40	35	30	40
<b>Pulpwood: pine</b>					
P1	Pulpwood with 6-10 cords per acre	80	65	50	80
P2	Pulpwood with 3-6 cords per acre	60	50	40	60
P3	Pulpwood with 1-3 cords per acre	40	35	30	40
<b>Reproduction: pine</b>					
R1	Good stand, 1000 stems and up per acre, 1-6 feet between stems	35	30	25	35
R2	Average stand, 500-1000 stems per acre, 6-9 feet between stems	30	25	20	30
R3	Poor stand, up to 500 stems per acre, spaced more than 9 feet apart	25	20	15	25
<b>Mixed timber</b>					
PH1	Mixed pine and bottomland hardwood on a pine site	60	50	40	60
PH2	Mixed pine and upland hardwood on a pine site	40	35	30	40
HP	Mixed hardwood and pine on upland or mountain hardwood site	30	25	20	30
<b>Hardwood</b>					
H1	Good hardwood sawtimber, 3 MBF and up per acre	50	40	40	50
H2	Operable hardwood sawtimber, 800-3,000 BF per acre	40	30	30	40
H3	Pole stands	30	20	20	30
H4	Cutover-reproduced brushland or burned land	20	15	10	20

<sup>1</sup>All criteria are approached from a "minimum" base of value only and may vary upward.  
All volumes based on Doyle Rule.

<sup>2</sup>MBF = thousand board feet.

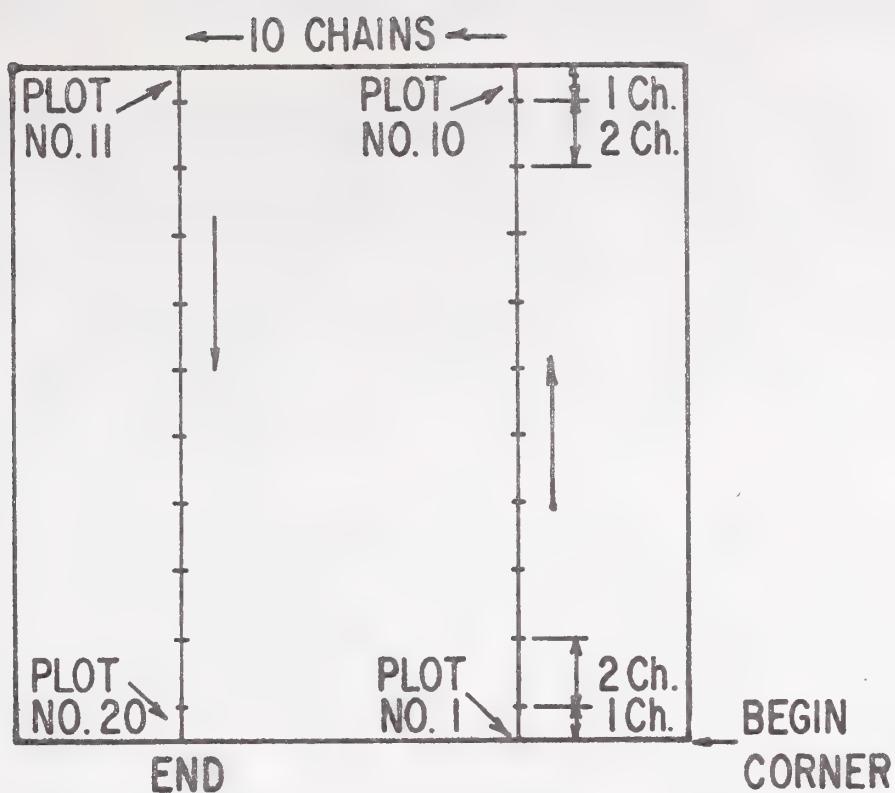


Figure 4.--Line sample plot cruise of a 40-acre tract for 10 percent cruise using 1/5-acre plots

The cruise begins at a known corner, then, pacing 5 chains, the first cruise line is located. The first plot is then located 1 chain from the beginning point on the cruise line and every 2 chains thereafter. When the plots are taken, the cruiser proceeds 10 chains on the same "40" to the next cruise line and takes 10 more plots. In this manner, 20 plots are sampled constituting 4 acres ( $20 \times 1/5$  acres), which is 10 percent of the "40".

#### Photo Interpretation

Definition.--Photo interpreting is the art of recognizing features on aerial photographs. In forestry, the interpreter must be able to distinguish pine from Hardwood, sawtimber-size trees from pulpwood, and recognize density.

Stereoscopic perception.--It is the ability to see in the third dimension. A good interpreter should have a high degree of stereoscopic perception, because the lack of this ability will be a serious handicap.

Experience.--Extensive experience in timber work is an essential requisite for interpreting aerial photographs. Timber cruising and estimating is probably the best type of experience. Before an object can be identified on a picture, the observer must know how it looks on

the ground. Constant field checking will be required until the interpreter becomes proficient.

Pictorial characteristics.--Objects can be identified on aerial photographs because of certain pictorial characteristics such as size, shape, shadow, tone, texture and dimension. Pine can be readily distinguished by tone. It appears darker than hardwood. In general, the older and denser the pine stand, the darker it appears. Contrast in tone is more easily recognized on infrared pictures. Texture, described in terms of smoothness, roughness and coarseness, is a very important recognition feature. Young pine of sapling size appears very fine and, depending upon age, grades from fine to coarse. Open-grown rough pine appears rough on photos regardless of age. Size and height will serve to distinguish the stand size. The older the timber, the taller it is. By this feature, sawtimber, pulpwood, saplings and reproduction can be identified. Site serves to identify some features. The most important consideration is to recognize upland from overflow bottomlands. Hardwood stands are classified by an on-the-ground inspection of the stand. Because it is impossible to recognize cull species, cull trees and poor quality on aerial photographs, these pictures must be restricted to area measurement, stand delineation and as an aid for location. Density is discussed in Exhibit 3, page 18.

Corner Locations in Timber Areas: See Exhibit 7.<sup>7</sup>

Estimating Standing Timber: See Exhibit 8.<sup>7</sup>

#### General

Use aerial photos in all phases of valuing timber. They can be used in cruising to locate stands down to 2-1/2 acres. With photos, the cruiser can go into the stand and measure several plots, or enough to be satisfied with a fairly representative sample. In this manner, homogeneous stands may be cruised with a low-intensity cruise (5 percent or less, depending upon the valuation in blocking).

#### Arkansas Exhibits

Exhibit 1.--Characteristics of the Four Forest Regions

Exhibit 2.--A Method of Random Cruises--A Schematic Diagram of a 40-Acre Cruise.

Exhibit 3.--Photo Density

Exhibit 4.--Definition of Terms

Exhibit 5.--Aerial Stereograms of Stand Classification<sup>7</sup>

Exhibit 6.--Ground Stereograms of Forest Stands<sup>7</sup>

Exhibit 7.--Corner Location in Timber Areas<sup>7</sup>

Exhibit 8.--Estimating Standing Timber Volume<sup>7</sup>

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<sup>7</sup> Exhibits 2, 5, 6, 7, and 8 are not reproduced here; they are found in the Commercial Forest Appraisal Schedule, Arkansas Public Service Commission, 22 pp.

Arkansas Exhibit 1.--Characteristics of the Four Forest Regions

The Coastal Plain Region.--The most important of the four regions. It is characterized by low, rolling hills, sandy soil, and by commercially important stands of pine and hardwood. The associated forest type is a loblolly-shortleaf-hardwood mixture. Growing seasons in this area are from 205 to 220 days. The climate is characterized by hot, humid summers and mild winters with an average temperature of 64°F. Average rainfall is from 50 to 55 inches. This region is the center of the Arkansas lumbering industry. Markets are readily available. Transportation is good. Extensive tree farming is practiced, with selective cuttings, for sustained growth.

The Ouachita Region.--Characterized by long distinct east-west ridges, shallow rocky soils, and a high potential for pine production. The associated forest type is the shortleaf pine-hardwood type. Growing seasons in this area are from 200 to 210 days. The climate is characterized by hot summers and mild winters, with average temperature of 62°F. Average rainfall is from 45 to 50 inches. This region falls second in the Arkansas timber industry. Markets are not always readily available for pulp and chips. Posts and pilings must be shipped to distant markets. Transportation is good, but confined mostly to trucking. Tree farming is not practiced on a large scale. Jack pine grows on the poorer soils. Much of the land is in National Forests.

The Ozark Region.--Composed predominantly of hardwood stands. The region is characterized by rugged mountains, rocky soils, depleted timber stands and relatively low productive potential. While the predominant forest type is upland hardwood, many of the south and west slopes could support productive pine stands. The climate is characterized by hot summers and mild winters with an average temperature of 60°F. The growing season is from 190 to 210 days. Average rainfall is from 40 to 50 inches. Markets are not readily available. Transportation is fair. Very little tree farming is practiced and then mainly on small, individual parcels. Much of the land is in National Forests.

The Delta Region.--An area of almost pure hardwood. Local pine stands are the exception. Much of the timber has been badly managed and cutover, with a high component of cull, defect, and valueless species. Six forest types are associated with this region. Soils are Bottomland, Loessial Terrace and Loessial Hills. Because these soils are valuable for farming in this principal row-crop region of Arkansas, timber is being cleared rapidly without marketing it. Land values for row-crops far outweigh that for timber. The climate is characterized by hot, humid summers and mild winters. The average temperature is 64°F. The average growing season is from 205 to 220 days. The average rainfall is 50 to 55 inches.

Arkansas Exhibit 3.—Photo Density

The recognition of photo density classes is based upon the use of a crown density scale (figure 5).

CROWN DENSITY SCALE

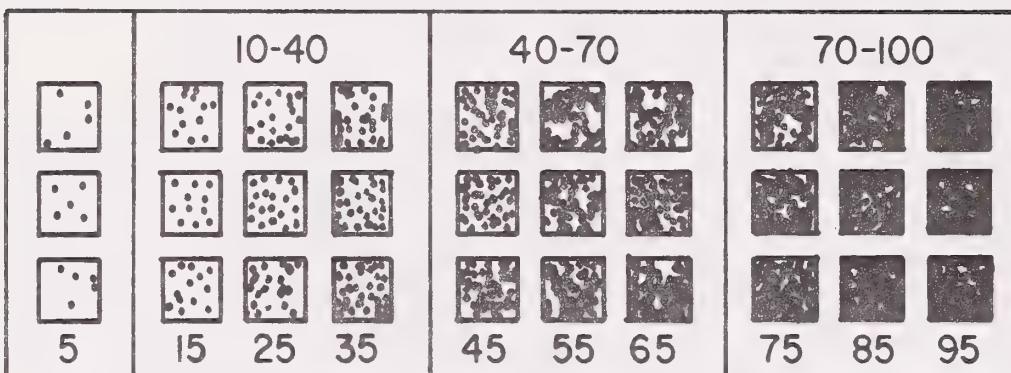


Figure 5.--Percent crown cover<sup>1</sup>

<sup>1</sup>Forest Survey, North Central Forest Experiment Station

Crown Density Scale

Measure the relative density of the stand by comparing the crown cover on the aerial photograph with a similar crown cover on the crown density scale. While the measure of density is not a measure of volume, it can be assumed that the more dense a stand the more value it has. Three density classes are recognized:

Crown class A.--70-100 percent of the stand area is covered with crowns of pine trees.

Crown class B.--40-69 percent of the stand area is covered with crowns of pine trees.

Crown class C.--10-39 percent of the stand area is covered with crowns of pine trees.

For all practical purposes, only the density of the dominant merchantable portion of the stand need be considered. If the dominant stand is sawtimber, ignore the understory. Only the density of the pine component will be considered. The hardwood stands must be classified by an on-the-ground inspection of the stand. The pine timber classes are:

Photo density

<u>Classes</u>	<u>Stand size</u>	<u>Class</u>	<u>Percent</u>
A1	Sawtimber	A	70-100
A2	Sawtimber	B	40-70
A3	Sawtimber	C	10-40
P1	Pulpwood	A	70-100
P2	Pulpwood	B	40-70
P3	Pulpwood	C	10-40
R1*	Reproduction	A	70-100
R2*	Reproduction	B	40-70
R3*	Reproduction	C	10-40

\*Look closely for seed trees in this area

Before attempting to employ the above procedures in timber volume estimating by use of aerial photos, follow this outline of work to ensure a high degree of accuracy:

- A. Make an intensive field reconnaissance of the forest survey area. Record on photograph the various forest types and forest sites observed and record other information that might facilitate photo interpretation.
- B. Obtain accurate information on a sufficient number of randomly selected forest plots within each forest type and site to yield data not determinable from photos.
- C. Simultaneously with paragraph "B" above, obtain data to prepare local tree volume tables and measurements for establishment of conversion factors to be used in photo interpretation.
- D. Summarize data collected.
- E. Interpret photos to classify every acre of land.

Classify all forest land in a survey unit according to forest type, site, and gross timber volume estimated for each. To accomplish this, delineate the obvious land use classifications. The following items are then considered in the order shown below:

- A. Outline nonforest areas such as water, farmland, and residential areas.
- B. Delineate nonproductive forest areas. These are forested rocky areas, grassy swampland, brushland or forested areas badly depleted by repeated fires.
- C. Sketch forest plantation boundaries. Old plantings are readily recognized. New ones, less than 5 years old when the aerial photographs were taken, can be determined only by field reconnaissance codings or from ownership records.

D. The remaining areas are productive forest lands.

See figure 6 for a chronological process of classifying land on aerial photographs.

See Exhibit 7<sup>8</sup> for type site, stand-size class and volume per acre class definitions.

### Stereograms<sup>9</sup>

The state guides include a set of aerial stereograms and a set of ground stereograms (Exhibits 5 and 6, respectively).<sup>8</sup> A stereoscope will magnify stereograms for viewing in three dimensions. Compare the stereo pairs with photographs for guidance in recognizing various stand conditions.

### Aerial Photos in General

The quality of aerial photographs varies somewhat from county to county because of film, photography, time of day, atmospheric conditions and seasons of photography. The use of panchromatic film in summer may be useless for forestry because of the lack of contrast between pine and hardwood. Once again, constant field checking is required of a good photo interpreter.

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<sup>8</sup>Exhibits 2, 5, 6, 7, and 8 are not reproduced here; they are found in the Commercial Forest Appraisal Schedule, Arkansas Public Service Commission. 22 pp.

<sup>9</sup>The Arkansas Assessor's Manual includes aerial and ground stereograms that illustrate typical stand classifications. These photographs have not been reproduced here.

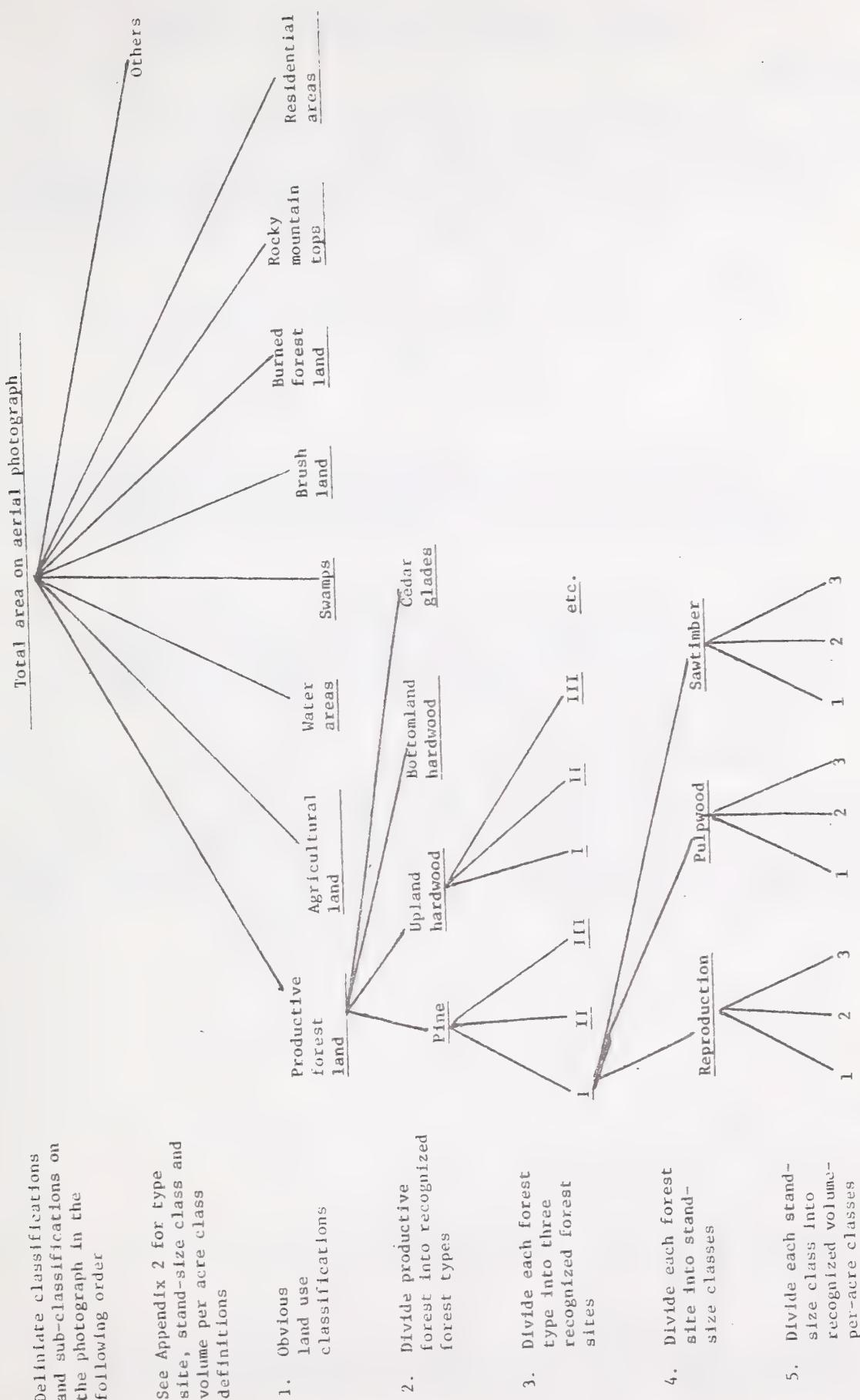


Figure 6.—Chronological process of classifying land on aerial photos

Arkansas Exhibit 4.--Definition of TermsForest Sites

Site is determined by the number of 16-foot logs contained in each mature dominant or co-dominant tree. Mature trees to be recognized in the survey should be pine with diameters of at least 20 inches d.b.h., and hardwood 16 inches d.b.h. Number of 16-foot logs by site and type:

<u>Forest site</u>	<u>Pine</u>	<u>Hardwood</u>
I	at least 5	at least 3
II	3 to 4 1/2	2 or 2 1/2
III	less than 3	less than 2

In areas where mature trees are not present, determine the site by comparing the heights and forms of the immature trees with heights and forms of immature trees found in mature stands of known site quality in similar locations.

Merchantable Tree Dimensions

## A. Minimum sawtimber-size trees:

1. Pine--10 inches d.b.h.
2. Hardwood--12 inches d.b.h.

## B. Minimum pulp or pole size trees:

1. Pine--5 inches d.b.h.
2. Hardwood--5 inches d.b.h.

## C. Minimum top diameters:

1. Pine--8 inches
2. Hardwood--12 inches

Stand Size Class

## A. Sawtimber minimum stands:

1. Pine--1,000 board feet per acre
2. Hardwood--800 board feet per acre

## B. Pulpwood minimum stands:

1. Pine--2 cords, but less than 1,000 board feet per acre
2. Hardwood--2 cords or pole timber with at least

12 x 12 feet spacing, and less than 800 board feet  
of sawtimber

C. Reproduction:

1. Seedlings and sapling stands less than 5 inches d.b.h.

Gross Volume per Acre Classes

A. Reproduction, seedlings and saplings:

1. Poor stand, less than 500 stems per acre
2. Average stand, 500 to 1,000 stems per acre
3. Good stand, 1,000 or more stems per acre

B. Pulpwood:

1. Light, 1 to 2.9 cords per acre
2. Medium, 3 to 5.9 cords per acre
3. Heavy, more than 6 cords per acre

C. Sawtimber:

1. Light, 1,000 to 2,999 board feet per acre
2. Medium, 3,000 to 5,999 board feet per acre
3. Heavy, more than 6,000 board feet per acre

Cull

Cull volume is the amount of wood that is unmerchantable because of decay or defects. It includes top sections of trees to merchantable limits usually left in the woods because of many limbs or excessive crook.

## CALIFORNIA

Assembly Bill No. 1258,<sup>10</sup> adopted in 1976, changed the existing system of taxing forest properties. Beginning with the 1977-78 fiscal year, privately owned land, and land acquired for State forest purposes, which is primarily devoted to and used for growing and harvesting timber, will be zoned for a minimum 10-year period as timberland preserve. The land in Timberland Preserve Zones (TPZ) is taxed on the basis of its value for growing and harvesting timber, plus the value, if any, of existing, compatible, nonexclusive use of the land. All timber is subject to a yield tax at the time of harvest and is exempt from the ad valorem property tax.

Definitions<sup>11</sup>

Timber.--Trees of any species maintained for eventual harvest for forest products, whether planted or of natural growth, standing or down, on privately or publicly owned land; including Christmas trees, but not nursery stock.

Timberland.--Privately owned land, or land acquired for State forests, which is devoted to and used for growing and harvesting timber, or for growing and harvesting timber and compatible uses. It is also capable of growing an average annual volume of wood fiber of at least 15 cubic feet per acre.

Timberland preserve zone (TPZ).--Any timberland which has been zoned pursuant to Section 51112 or 51113.

Compatible use.--Any use which does not significantly detract from, or inhibit, growing and harvesting timber. This definition includes, but is not limited to the following uses when they are consistent with timber production:

- Management for watershed
- Management for fish and wildlife habitat or hunting and fishing
- A use integrally related to the growing, harvesting, and processing of forest products including, but not limited to roads, log landings, and log storage areas

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<sup>10</sup> Known as the Z'bert-Warren-Keene-Collier Forest Taxation Reform Act of 1976.

<sup>11</sup> Section 51100 of Assembly Bill No. 1258.

- The erection, construction, alteration, or maintenance of gas, electric, water, or communication transmission facilities
- Grazing

### Classification<sup>12</sup>

The California State Board of Equalization, in consultation with the Timber Advisory Committee, prepared instructions on temporary criteria and procedures for grading timberland.<sup>12</sup> Classifications are based on site quality and operability. Local assessors grade all timberland within each county according to these instructions.

#### Site Quality

Timberland is rated for wood productivity. Five general, site quality classes are established by the California State Board of Forestry. In this classification system, site I denotes areas of high productivity and site V denotes areas of lowest productivity (table 2). Site classification is measured by the heights of dominant trees at a specified age within areas capable of growing trees of a given species or mixture of species. All TPZ lands must be classified according to this system.

To determine the site quality class of a particular parcel of land, check the following sources:

1. Timber-stand and soil vegetation surveys in California, available from the Regional Office, USDA Forest Service<sup>13</sup>
2. Vegetation and forest condition maps, also from the Regional Office, USDA Forest Service
3. USDA Soil Conservation Service
4. Local USDA Forest Service office
5. Private timber owners, particularly the larger timber companies.

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<sup>12</sup> Instructions for Timberland Site Grading, adopted by the California State Board of Equalization, July 28, 1976. Approved by the Timber Advisory Committee, July 15, 1976.

<sup>13</sup> The instructions provided by the California State Board of Equalization may be obtained by writing to: Deputy Regional Forester, State and Private Forestry, USDA Forest Service, 630 Sansome Street, San Francisco, Calif. 94111.

Table 2.--Timberland site classification in California

Productivity potential	Young-growth Redwood <sup>1</sup>		Douglas-fir <sup>2</sup>		Ponderosa pine, Jeffrey pine, mixed conifer & true fir <sup>3</sup>		
	Site class	Site index	Site class	Site index	Site class	Site index	Site index
- - - - feet at 100 years - - - -							
Highest	I	180 or more	I	194 or more	I	114 or more	163 or more
	II	155-179	II	164-193	II	93-113	138-162
Intermediate	III	130-154	III	134-163	III	75-92	113-137
	IV	105-129	IV	103-133	IV	60-74	88-112
Lowest	V	Less than 105	V	Less than 103	V	Less than 60	Less than 88

<sup>1</sup>Lindquist, James L. and Marshall N. Palley. Empirical yield tables for young-growth redwood, Calif. Agr. Exp. Sta. Bull. 796, 47 pp. 1963 (Site index based on average height of dominant trees at breast height age of 100 years). Use in young-growth redwood stands in which more than 20 percent of the stand by basal area is redwood and when sufficient dominant redwood trees are available to determine site index.

<sup>2</sup>McArdle, Richard E. and Walter H. Meyer. The yield of Douglas-fir in the Pacific Northwest. USDA Tech. Bull. 201, 74 pp. Rev. 1961. Adjusted to average height of dominant trees after Forest Research Note No. 44, Pacific Northwest Forest and Range Experiment station, by Forest Survey, Calif. Forest and Range Exp. Stn. 1948 (Site index based on average height of dominant trees at age 100 years). Use in young-growth redwood stands in which 20 percent or less of the stand by basal area is redwood or when sufficient dominant redwood trees are not available to determine site index. Use also in old-growth redwood stands. In such cases, measure Douglas-fir trees to determine site index. Also use for Sitka spruce, grand fir, hemlock, bishop's pine, and Monterey pine stands.

<sup>3</sup>Dunning, Duncan. A site classification for the mixed conifer selection forests of the Sierra Nevada. USDA Forest Serv. Calif. Forest and Range Exp. Sta. For. Res. Note 28, 21 pp. 1942 (Site index based on average height of dominant trees at age 100 and 300 years). Use also for lodgepole pine stands. For old-growth stands, use height of dominants at age 300 years.

When site quality information is not available from the above sources, make direct field observations to determine site index. The following procedure will assure the proper use of site index:

1. Select the trees to be sampled.

A. Select the proper tree species (table 3).

Table 3.--California site index source references

<u>Timber type</u>	<u>Site tree</u>	<u>Site curve</u>
PP--Ponderosa pine in pure stands or mixed with any species.	PP	Dunning (mixed conifer)
JP--Jeffrey pine in pure stands or mixed with any species except PP.	JP	Dunning (mixed conifer)
SP--Sugar pine in pure stands.	SP	Dunning (mixed conifer)
DF--Douglas-fir mixed with any species except PP and JP.	DF	Douglas-fir
WF--White fir predominant.	WF	Dunning (mixed conifer)
RF--Red fir predominant.	RF	Dunning (mixed conifer)
RD--Redwood, Douglas-fir.	DF	Douglas-fir
R--Redwood, second growth.	R	Coastal Redwood Lindquist and Pally

B. Select only average, sound, dominant trees. Trees selected should always have been dominants. Reject trees when growth rings or increment cores show periods of suppression. In cut-over or selectively logged areas, the present dominants may not have always been true dominants. Open-grown trees are not good site trees. A suitable tree for site determination is one which represents the age-height relationship of the average dominant trees of a particular area.

C. Preferably, select trees between 70 and 120 years old. Trees younger than 70 may give inaccurate site values. For those older than 120 years, age will be more difficult to determine.

2. Measure tree age and height. Measure height with an Abney level and tape or other suitable optical instrument. Determine the age from a ring count of an increment boring at d.b.h. (4.5 feet above average ground level) plus an estimate of the years required to grow to d.b.h.
3. Acreage limitation. In subdividing areas on the basis of a difference in site classification, 40 acres should be the minimum size classified. If there is a substantial break in a site class, i.e., Site III to rock outcrops, it may be worthwhile to delineate areas as small as 10 acres, but this exception should be rare.
4. Use of site curves. Put the age and height figures into the proper site curve to obtain the site class. Table 3 can be used as a guide for selecting the proper tree species.<sup>14</sup>

It may be necessary to determine site quality for areas where no site trees are available, e.g., where fires or heavy logging have taken place. Guidance is available in several publications that may be obtained from the Pacific Southwest <sup>15</sup> of the Pacific Northwest Forest and Range Stations, USDA Forest Service.

#### Operability

Examples of operability factors include accessibility, topography, and legal restraints. Inoperable lands must be identified and classified as such by the assessor. For the purposes of land site classification, inoperable will be defined as:

- Extreme physical barriers preventing access
- Legal or administrative barriers or restraints (rights-of-way, etc.) preventing access or harvesting
- Areas within commercial forest zones, but too rocky, steep, or sterile to produce and harvest merchantable timber

If the assessor designates an area as inoperable, such land shall be valued as if it is site V.

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<sup>14</sup>The instructions prepared by the California State Board of Equalization include various sets of site index curves to be used in determining site index.

<sup>15</sup>P.O. Box 245, Berkeley, Calif. 94701 and 809 NE 6th Avenue, Portland, Oregon 97232.

### Schedule of Values

Once the quality and operability class have been established, the assessor obtains the appropriate per-acre value from the schedule of values adopted by the California State Board of Equalization.<sup>16</sup> The following schedule applies up to, and including, March 1, 1978:

<u>Redwood region</u>	<u>Pine-mixed conifer region</u>
	<u>\$/acre</u>
Site I	80
Site II	60
Site III	50
Site IV	30
Site V (inoperable)	20
Site I	60
Site II	50
Site III	40
Site IV	30
Site V (inoperable)	20

The assessor shall add value, if any, attributable to existing compatible, nonexclusive uses of the land.

The Board prepares timberland value schedules every 3 years. The Board re-establishes the value of each grade of timberland as if it were bare of forest growth, and recognizing that the restricted use of the land is for growing and harvesting timber and compatible uses.

The Board may value TPZ land on the basis of the sales of comparable timberlands. However, to be considered comparable, the properties sold must contain at least 160 acres and shall be similarly restricted under a timberland preserve zone. Size and any discount for size and amenities are not factors in determining the value of land zoned as timberland preserve which is valued by a method employing the use of comparable sales.

The per-acre value of TPZ land is not to be greater than the value that would be derived by the Board using the following procedure:

1. Prepare timberland site capability tables which prescribe, by site classification, the potential annual yield of wood by species or mixture of species per acre.
2. Multiply the potential annual yield by 10 percent. Under law, this percentage is the average income that can be attributed to potential wood yields, annually. When the per-acre value of timberland is based on sales of TPZ land, the value shall not exceed the same 10-percent figure.
3. Multiply the result of number 2 by an immediate harvest value, averaged for the previous 20 quarters. The harvest value must be appropriate for the selected geographic area.

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<sup>16</sup>Assembly Bill No. 1258, Section 434.5.

4. Divide the result obtained in step 3 by a capitalization rate of 10 percent expressed as a decimal.

The value of each acre of TPZ land shall be presumed to be no less than \$20 per acre.

#### COLORADO<sup>17</sup>

Timberlands, leaseholds, and possessory interest should be classified and valued as such. Commercial timberland is stocked with at least 1,500 board feet per acre. Possessory interest in timberlands includes, but is not limited to, timber contract sales from any department of the Federal or State government.

The first step in inventorying timberlands is to obtain aerial photographs of the largest possible scale. Locate all privately owned commercial timberland on the photographs. Because timberlands are capable of producing income, and because investors typically buy and sell on this basis, the income approach is the primary method used in arriving at the value of these properties. This approach is based on the theory that value of property is equal to the present worth of the net income it will produce during the remainder of its productive life. Whenever possible, confirm sales data and analyze it to substantiate the values arrived at through the income approach.

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<sup>17</sup>Department of Taxation. AH 300, Appraisal procedures and instructions for 1977, Section VII, pp. 6-7.

## CONNECTICUT

Forest property may be assessed under one of two laws: (1) Open Space Law, or (2) Yield Tax Law.

### Open Space Law<sup>18</sup>

Upon application, property classified as farm, forest, or open space land is assessed for taxation on the basis of its value in its current use without regard to neighborhood land use of a more intensive nature. Also, the value of such property is not to be based upon the price received at a forced or auction sale. In no case is the value of open space land to be less than it would be if it comprised part of a tract of land classified as farm land.

Farm land is defined to include woodlands and wastelands constituting part of a farm unit.

Forest land means any tracts equaling at least 25 acres, bearing tree growth in such quantity and so spaced as to constitute a forest area in the opinion of the state forester. It should also be maintained in a state of proper forest condition.

Open space land means any area of land, including forest land and not excluding farm land, on which the preservation or restriction of its use would (1) maintain and enhance the conservation of natural or scenic resource; (2) protect natural streams or water supply; (3) promote conservation of soils, wetlands, beaches, or tidal marshes; (4) enhance the value to the public of abutting or neighboring parks, forest, wildlife preserves, nature reservations or sanctuaries, or other open spaces; (5) enhance public recreation opportunities; (6) preserve historic sites; or (7) promote orderly urban or suburban development.

### Yield Tax Law<sup>19</sup>

To qualify for taxation under the provisions of this law, a tract of land must be at least 25 acres and must consist of woodland or land suitable for forest planting with a value not to exceed \$100 per acre, exclusive of timber. Two types of tracts are eligible: (1) land bearing timber greater than 10 years old, the timber having a taxable value, and (2) land which is fully or partially stocked with timber less than 10 years old and, except for scattered older trees, the timber value does not increase the assessment of the property. Partially stocked

<sup>18</sup>Public Act 490.

<sup>19</sup>Public Act 73-585.

tracts must be planted so as to assure an approximate 8 by 8 foot spacing over the entire area with not less than 700 trees per acre. Planted trees must be of a species named in the Act or approved by the state forester.

The land is valued at the time of classification under this law and revalued every 50 years. During the first and second 50-year periods, the land is taxed on its established value at the local rates, not to exceed 10 mills. Thereafter, the land is taxed at the local rate but the 10-mill restriction is removed.

The timber on tracts of type 1, above, is taxed in the same manner as the land. In addition, a graduated yield tax is levied at the following rates when the timber is harvested:

Number of years following classification	Percent of yield
1-10	2
11-20	3
21-30	4
31-40	5
41-50	6
over 50	7

On tracts of type 2, above, a 10-percent yield tax is levied at the time of harvest.

## DELAWARE

The Farmland Assessment Act<sup>20</sup> provides for the assessment of qualified agricultural, horticultural, and forest land on the basis of productivity value in its current use rather than on the basis of market value. To qualify for preferential treatment, land must be at least 5 acres in size and actively devoted to one of the land uses mentioned above, and have been so devoted for at least the 2 years immediately preceding the tax year in issue. Furthermore, the landowner must apply for classification and assessment under the provisions of this Act.

Land is deemed to be in forest use when it is devoted to tree growth in such quantity and so spaced and maintained as to constitute a forest area in the opinion of the state forester. Agricultural use is defined to include the production of trees and forest products, etc.

### Appraisal

The State Farmland Evaluation Committee, created by the 1968 Act, meets from time to time to determine and publish a range of values based upon productive capabilities for each classification of farmland<sup>21</sup> in the State. The Committee considers the soil survey and other evidence on the value of land devoted exclusively to agricultural, horticultural, or forest uses as it may deem pertinent.

Each year these ranges of fair value are made available to the assessing authority in each taxing district in which qualified land is located. The following information is from the report submitted in 1976 by the State Farmland Evaluation Advisory Committee in conformity with the Act.

### Farmland Soil Groupings

To aid in the evaluation process, the various soil types in the State are placed into five productivity groups.<sup>22</sup> The soils are grouped and rated based on the moisture retaining characteristics of the soil, inherent and potential fertility, the mechanical composition,

<sup>20</sup>Delaware Code Chapter 83, Title 9, as amended by Senate Bill No. 412.

<sup>21</sup>"Farmland" is used as a general term in the context of Delaware Guides and refers to agricultural, horticultural, and forestry land uses.

<sup>22</sup>A listing of soil types by productivity group is included in Exhibit B, page 41.

droughtiness, drainage, slope, erosion and other related soil properties. Nonsoil factors such as improved roads, nearness to highways and markets, and water supply are not considered. The ratings are based on the suitability of the land for crops normally grown in the State. Corn yields obtained on these soils serve as the chief criteria because (1) more information is available for corn yields, (2) it is a responsive indicator crop, and (3) the yields of corn should closely reflect the yields of most other crops. The five soil groupings include:

Group A.--Soils with very high productivity. Suitable for permanent cultivation. With proper management, yields are high. These are the most productive soils in the area.

Group B.--Soils with high productivity. Suitable for permanent cultivation. Yields are fairly high with proper management, but not as high nor as consistently high as those soils in Group A.

Group C.--Soils with medium productivity. Suitable for permanent agriculture. Yields tend to be lower than for soils in Groups A and B with similar management. High yields may be obtained only by the use of practices such as drainage and irrigation. Some of the soils of this group cannot be cultivated without these practices, especially drainage. The limiting factors are generally droughtiness or excessive moisture, but occasionally steepness or erosion.

Group D.--Soils with low productivity. May be suitable for cultivation, but yields tend to be low or excessive hazards must be overcome. The most common hazards to crop production on these soils are droughtiness and steep slopes; occasionally, wetness or excessive erosion may create hazards.

Group E.--Soils with very severe limitations. Not suited for cultivated crops and generally not tillable, but may be used as pasture. Mostly steep and eroded soils, occasionally wet land.

Recent soil maps and related soil surveys are available for the three counties in Delaware.

#### Land Use Classes

The primary uses of Delaware farm land fall into three distinct classes, described below.

1. Cropland.--This is the heart of the farm and represents the highest use of the land in agriculture. Land from which a crop was harvested, including pasture and hay in the current year, falls into this category along with cropland not harvested and not pastured.

2. Other land.--This land is not cropped. It includes farm lots, ditches, ponds, roads, woodland pastures, nontillable land in pasture, wasteland, etc.

3. Forest.--Forested areas and land in a managed state of reforestation, including Christmas trees. May include multiple use of forested area for conservation, watersheds, wildlife cover, nature trails, windbreaks.

#### Table of Values

The values in table 4 capitalize the net income from farmland and allocate it on the basis of the five soil productivity groups and the three most common uses of land by farmers.<sup>23</sup> The assessor uses this table to determine the productivity value of qualifying land under the following procedure:

1. Use of a county soil map to determine the soil type(s) of the particular parcel of land.

2. Determination of the basic farmland soil group for each soil type. A list is provided which categorizes all soil types into one of the five basic soil groups. A portion of the categorized list of soil types in New Castle County is provided in Exhibit B.

3. Knowing the soil group and land use, the recommended per-acre value for the land can now be read off of table 4 for the appropriate county.

The values in table 4 guide the assessor, but they may be, and should be, modified in individual cases. The ultimate responsibility for determining the value of qualified lands remains with the assessor. In addition to this table of values, the assessor uses his or her personal knowledge, judgment, and experience to evaluate farmlands.

#### Rollback Taxes

When land that is being assessed under the provisions of this Act is applied to a nonqualifying use, it is subject to a rollback tax. This tax is equal to the difference of taxes paid when assessed under the Act and what would have been paid had the land been assessed and taxed as other qualifying land in the taxing district. The rollback tax applies to the 2 tax years immediately preceding the year in which the change to a nonqualifying use was made.

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<sup>23</sup>The derivation of the values in table 4 is outlined in detail in Exhibit A.

Table 4.—Estimates of ranges in fair value of Delaware farmland based upon its productive capabilities when devoted to agricultural, horticultural, or forest use—by county

County	Soil group	Cropland <sup>1</sup>		Other Land <sup>2</sup>		Forest <sup>3</sup>	
		Soil rating	Dollars per acre	Soil rating	Dollars per acre	Soil rating	Dollars per acre
New Castle	A	120	468	110	108	110	65
	B	100	390	100	98	110	65
	C	80	312	80	78	100	59
	D	60	234	70	69	100	59
	E	40	156	60	59	90	53
Kent	A	120	499	110	114	110	68
	B	100	416	100	104	110	68
	C	80	333	80	83	100	62
	D	60	250	70	73	100	62
	E	40	166	60	62	90	56
Sussex	A	120	528	110	121	110	73
	B	100	440	100	110	110	73
	C	80	352	80	88	100	66
	D	60	264	70	77	100	66
	E	40	176	60	66	90	59

<sup>1</sup> Includes land in pasture and hay and land suitable for cropping.

<sup>2</sup> This land is not cropped. It includes land in farm lots, ditches, ponds, roads, woodland pastures, wasteland, etc.

<sup>3</sup> Adjusted on the present potential for income.

Delaware Exhibit ADerivation of Farmland Values

The values in table 4 are derived through an income approach, outlined below. Because farm income fluctuates considerably, 5-year averages are used. The most recent 5-year period for which complete farm income and production expense data are available is 1971 through 1975.

1. Determine acreage in each farmland use.--The U.S. Census of Agriculture, published every 5 years, categorizes farmland-use acreage for each county. These categories are: (a) cropland, (b) other land, (c) woodland (called forest in this report). Acreage for noncensus years is determined by projecting trends in land use as shown in the Agricultural Census for the preceding 10-year period. A 5-year average acreage of land use in each class for each county is shown in table 5.

Table 5.--Acreage of Delaware farmland by use class, 5-year average, 1971-75

Use class	County		
	New Castle	Kent	Sussex
-----acres-----			
Cropland	88,567	163,165	252,235
Other land	11,325	27,131	32,529
Forest	8,391	22,640	49,967

2. Determine average annual net income.--The U.S. Department of Agriculture publishes annual estimates of State farm income and farm production costs.<sup>24</sup> The Department of Agricultural and Food Economics, University of Delaware, publishes county estimates of gross income by commodities.<sup>25</sup> The figures in table 6 are based on three reports.

<sup>24</sup> Farm Income, State Estimates, published by USDA's Economics, Statistics and Cooperatives Service.

<sup>25</sup> Delaware Farm Income, published annually by the Department of Agricultural and Food Economics, University of Delaware.

Table 6.--Gross income, production expenses and net income, 5-year average, 1971-75, for Delaware farms

Report	County		
	New Castle	Kent	Sussex
-----dollars-----			
Gross income <sup>1</sup>	16,824,507	33,872,931	49,610,422
Production expenses <sup>2</sup>	11,765,406	23,767,664	33,110,930
Net income	5,059,101	10,105,267	16,499,492

<sup>1</sup>Excludes income from poultry, greenhouses, and mushrooms.

<sup>2</sup>Excludes expenses associated with poultry, greenhouses, mushrooms, honey and beeswax.

3. Calculate total land value in farmland use.--Determine land values by capitalizing the average annual net income by 14 percent. The 14 percent is 8.25 percent return on investment and 5.75 percent return for operator's labor. Capitalized values of farmland are shown in table 7.

Table 7.--Capitalized value of Delaware land in agricultural use

Value category	County		
	New Castle	Kent	Sussex
-----dollars-----			
Net income--5-year average, 1971-75	5,059,101	10,105,267	16,499,492
Value capitalized at 14 percent	36,136,436	72,180,479	117,853,514

4. Calculate the "land value factor" for each county.--Each agricultural use class is given a per-acre productivity rating, as shown in table 8. The relative productivity rating of the three use classes is based on estimates of the Plant Science and the Agricultural and Food Economics Departments of the University of Delaware.

Table 8.--Productivity rating of Delaware land use classes

Land use class	Productivity rating
Cropland	20
Other land	5
Forest	3

The land value factors in table 9 are calculated for each county as follows:

A. The acres in each land use class (from table 5) are multiplied by the production rating of the particular class (from table 8).

B. These values are summed and then divided into the total capitalized value of farmland in the county (from table 7).

Table 9.--Computation of Delaware land value factors

County and land class	Acres	Productivity rating	Capitalized value	Land value factor
<u>New Castle</u>				
Cropland	88,567	x 20 = 1,771,340		
Other land	11,325	x 5 = 56,625		
Forest	8,391	x 3 = <u>25,173</u>		
	Totals	1,853,138	36,136,436	\$19.50
<u>Kent</u>				
Cropland	163,165	x 20 = 3,263,300		
Other land	27,131	x 5 = 135,655		
Forest	22,640	x 3 = <u>67,920</u>		
	Totals	3,466,875	72,180,479	\$20.82
<u>Sussex</u>				
Cropland	252,235	x 20 = 5,044,700		
Other land	32,529	x 5 = 162,645		
Forest	49,967	x 3 = <u>149,901</u>		
	Totals	5,357,246	117,853,514	\$22.00

The factors which result from these computations are equal to the average value per productivity rating point per acre. For example, the land value factor for New Castle County is \$19.50 (see table 9). Therefore, the per acre value of forest land in this county is

$$(\$19.50) \times (\text{productivity rating for forest land} = 3) \\ = \$58.50, \text{ or rounded to } \$59 \text{ (see table 10).}$$

5. Calculate average value per acre for each land use class, by county.--This is done by multiplying the land value factors from table 9 by the productivity ratings in table 8. The result is table 10. These average values are then adjusted for the potential productivity of the soil groups. These adjusted values, shown in table 4, are the final estimates of the fair value of farmland based upon its productive capabilities for agricultural, horticultural, or forest uses.

Table 10.--Average value per acre of Delaware classes of farmland, based on capitalized net farm income--by county

County	Cropland <sup>1</sup>	Other land <sup>2</sup>	Forest <sup>3</sup>
----- dollars per acre -----			
New Castle	390	98	59
Kent	416	104	62
Sussex	440	110	66

<sup>1</sup>Includes land in pasture, hay and land suitable for cropping.

<sup>2</sup>This land is not cropped. It includes land in farm lots, ditches, ponds, roads, woodland pastures, wasteland, etc.

<sup>3</sup>Adjusted on the present potential for income.

Delaware Exhibit B.--Classification and Grouping of Soils in New Castle County<sup>26</sup>

Field mapping symbol	Mapping unit name
<u>Group A.--Soils with very high productivity</u>	
BuA	Butlertown silt loam, 0 to 2 percent slopes
BuB2	Butlertown silt loam, 2 to 5 percent slopes, moderately eroded
ChA	Chester loam, 0 to 3 percent slopes
Co	Codorus silt loam
CsB2	Collington fine sandy loam, 2 to 5 percent slopes, moderately eroded
<u>Group B.--Soils with high productivity</u>	
AdA	Aldino silt loam, 0 to 3 percent slopes
AdB2	Aldino silt loam, 3 to 8 percent slopes, moderately eroded
AM	Aldino-Keyport-Mattapex Urban land complex
BuC2	Butlertown silt loam, 5 to 10 percent slopes, moderately eroded
ChB2	Chester loam, 3 to 8 percent slopes, moderately eroded
ChC2	Chester loam, 8 to 15 percent slopes, moderately eroded
DeB2	Delanco silt loam, 3 to 8 percent slopes, moderately eroded
EaB2	Elioak silt loam, 3 to 8 percent slopes, moderately eroded
EnB2	Elsinboro silt loam, 3 to 8 percent slopes, moderately eroded
EnC2	Elsinboro silt loam, 8 to 15 percent slopes, moderately eroded

<sup>26</sup>Only a portion of the list is shown. There are actually five soil groups and Groups A and B include more soil types than are shown in the illustration. A complete list is provided for all of the counties in the 1976 Report of the State Farmland Evaluation Advisory Committee.

## FLORIDA

The county assessor classifies all land as either agricultural or non-agricultural. Forest land is included in the agricultural classification. Land classified as agricultural is eligible for modified assessments, for property tax purposes, based on its value in agricultural use.<sup>27</sup> Timber is considered an agricultural crop and is exempt from the property tax.<sup>28</sup>

The taxpayer may be required to establish that the land is actually used for a bona fide agricultural purpose, which means good faith commercial agricultural use of the land.<sup>29</sup> Good faith, commercial, agricultural use of property is defined as the pursuit of an agricultural activity for a reasonable profit or at least upon a reasonable expectation of meeting investment cost and realizing a reasonable profit. The profit or reasonable expectation of profit must be viewed from the standpoint of the free owner and measured in light of the owner's investment.<sup>30</sup>

The purchase price paid for land is considered in determining the agricultural classification. A purchase price above the land's agricultural value, derived by the capitalization of the income to be produced by the land in an agricultural use, can indicate lack of good faith, commercial, agricultural use. If the purchase price is more than three times greater than the agricultural value, the land presumably is not being used primarily for agricultural purposes. The burden of overcoming this presumption rests with the owner.<sup>31</sup>

#### Assessment of Woodlands<sup>32</sup>

##### Description of the Resource

Pines are the primary species in approximately 65 percent of Florida's 16 million acres in woodlands. The Florida Division of Forestry reports, "93 percent of Florida's timber is grown in the northern part of the State, roughly north of Disney World; and all indications are

<sup>27</sup>Florida Statutes, Sections 193.461 (5), (6) (a).

<sup>28</sup> Op. Cit., Section 193.451.

<sup>29</sup> Op. Cit., Section 193.461.

<sup>30</sup>Department of Revenue Rules 12D-5.01, F.A.C.

<sup>31</sup>Department of Revenue Rules 12D-5.02, F.A.C.

<sup>32</sup>Office of Comptroller. Manual of instruction for ad valorem tax administration. Jacksonville.

that this proportion may be even higher at the turn of the century.<sup>33</sup> Of the pine acreage, approximately 25 percent is in plantations. About 3 to 4 percent of these plantations are "old field" plantations; the balance is in forest site plantations. The primary products derived from these operations are pulpwood, sawtimber, poles, logs and bolts.

Usable hardwoods or cypress grow in a large portion of fresh water swampland in Florida. Upland hardwoods are also prevalent in many areas. Generally, the hardwood and cypress industry in Florida harvests whatever trees of sufficient size and quality are available, with minor emphasis toward management of timber on these areas.

Woodland is considered to have two categories: Productive and non-productive. Productive woodland is land which is: (1) producing or is physically capable of producing usable crops of wood, (2) economically accessible now or in the foreseeable future, and (3) not withdrawn from wood products utilization for use as parks, orchards, pastures or other purposes.

Nonproductive woodland is defined as nonproductive swamps or marshes, depleted mines, dumps, pits, lakes, ponds or other nonproductive or waste land. This definition also includes land from which the timber has been removed, but which has, for bona fide forestry reasons, not yet been replanted. It excludes homesites or building areas occupied by ornamental trees.

#### Valuation

Agricultural land is valued for its productivity and ultimately for its ability to generate income. The income approach to valuation is recommended for agricultural lands, including forest lands.<sup>34</sup> With this approach, the value of the land is equal to the capitalized value of the net earnings attributable to the land.

Because arms-length market sales of land for agricultural use reflects the buyer's evaluation of the earning potential of the land, any land values computed on an income approach which exceed market sales values should be re-evaluated to determine if the components were adequately accounted for in the income computation.

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<sup>33</sup>Smith, Walter. 1974. Timber for Florida today and tomorrow: A summary report. Division of Forestry, Tallahassee.

<sup>34</sup>Although the income approach is recommended, the market and cost replacement approaches are also discussed in the Manual of Instructions for Ad Valorem Tax Administration.

### Procedure for Appraisal

This section describes a procedure to appraise woodlands for average annual growth potential from seedling to economically mature timber. This is a modified "sustained yield" method that converts an annual increment of growth value into a dollar value. Expenditures for management and protection are deducted and the resulting annual net income is capitalized. Basically, the formula in the income approach is:

$$\text{Value} = \frac{(\text{yield} \times \text{price}) - \text{costs}}{\text{capitalization rate}}$$

The primary factors influencing woodland values are:

1. Productivity of soil expressed as site index
2. Local stumpage prices in the area
3. Management costs which include cost of site preparation, planting and annual recurring expenses
4. Capitalization rate

County property appraisers must establish these four factors for their counties to arrive at assessed values for woodlands.

Site index.--Productive capacity may be generally determined from site index yield tables for pine stands. Slash pine yield tables are used in this Guide because slash pine is the predominant species under intensive management in Florida.

Site index is defined as the average total height of the dominant or co-dominant trees (dominant stand) at either 25 or 50 years of age. Normally, 25-year site indexes (sometimes referred to as site quality) are applied to planted stands and 50-year indexes are applied to natural timber. A 25-year index can be converted to a 50-year index by adding 20 feet to the 25-year index, which gives an equivalent 50-year index. A site index is obtained by measuring the height of a representative tree and determining its age. This data is applied to a site index curve and a reading in feet is made.<sup>35</sup>

The number of sample points required to establish the site index for a given parcel of land depends on the size of the parcel and the variability of the soil. A few measurements may suffice if the soil is relatively uniform, but otherwise many may be required. Some parcels may be represented by a single pine site index figure.

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<sup>35</sup> Site index curves are provided in the Manual of Instructions for Ad Valorem Tax Administration for natural southern pine and planted slash pine stands. These sets of curves have not been reproduced in this summary.

Site index measurements on young trees are frequently not very reliable. Measurements on trees under 15 years of age, especially on lower than average sites, should be used with caution. A check on the correctness of site index measurements may be obtained by comparing them with those on neighboring parcels having similar soils. The site index should not change abruptly from parcel to parcel without an accompanying noticeable change in the timber, other vegetation, or the soil.

Where a parcel of land has no suitable trees to measure for a site index, establish an index by comparing the site with adjacent or neighboring tracts having similar soil. The Department of Revenue, county forester or representative of the Division of Forestry, an industry forester and other professional foresters will assist the county property appraiser in establishing the indexes in these areas.

Many company and individual forest land managers have site index information on their property which they will furnish upon request. County property appraisers should realize that their use of site index information to reflect value on an entire parcel is subject to some judgment and it is an estimate of value. The Department of Revenue will help them to familiarize themselves with the technique of obtaining a site index.

The property appraiser uses the five site index classes for productive pine timberland as set out in this guide. When all five classes are not present in a county, then establish only those classes that are present. The classes consist of 10-foot increments on a 50-year basis with a range of 50 to 90 feet and over.

Yields.--The annual growth increment expressed in cords per acre per year can be obtained from table 11 which gives yields for the five established index classes. The yield tables used for this purpose were Schumacher and Coile's Growth and Yield of Natural Stands of the Southern Pines and Bennett and Clutter's "Per Acre Sawtimber, Pulpwood and Gum Yields--25 Years Basis" from table 14 of the USDA Forest Service Research Paper SE-35.

In addition to natural pine and planted old fields, there is the timber type referred to as forest site plantations. These are plantations established with various amounts of site preparation and in recent years planted with seedlings with improved growth characteristics. Although no published yield tables for forest site plantations are available, preliminary studies show that yields from these plantations fall near midpoint between yields of old field plantations and those of well stocked natural stands. Calculated yield figures from these sources are presented in table 11.

Stumpage Prices.--Prices paid for stumpage vary considerably throughout Florida. Historically, prices have been highest in the northeast, lessening in the northwest and least in the south. Patterns

Table 11.--Integrated yield data for Florida forests

Pine classification (30-year rotation)	Site index (50 years)	Site index (25 years)	Yield (cords)
Natural: no. trees/acre given <sup>1</sup> Planted: @ 400 trees/acre <sup>2</sup>	95 avg. 90+	75 avg. 70+	1.62 Timberland 1 1.98 "
Natural: no. trees/acre given Planted: @ 400 trees/acre	85 avg. 80-89	65 avg. 60-69	1.28 Timberland 2 1.48 "
Natural: no. trees/acre given Planted: @ 400 trees/acre	75 avg. 70-79	55 avg. 50-59	1.00 Timberland 3 1.10 "
Natural: no. trees/acre given Planted: @ 400 trees/acre	65 avg. 60-69	45 avg. 40-49	.75 Timberland 4 .55 Timberland 5 "
Natural: no. trees/acre given Planted: @ 400 trees/acre	55 avg. 50-59	35 avg. 30-39	

Note: No yield information is given for SI 50 and 60 (50 yr.) in the Bennett and Clutter SE-35; the volumes above are from Coile and Schumacher's natural slash pine tables.

<sup>1</sup>Natural: The number of trees per acre is given in the table in Growth and Yield of Natural Stands of the Southern Pines, by Schumacher and Coile.

<sup>2</sup>Planted: A density of 400 trees per acre is selected from a table in "Multiple Product Yield Estimates for Unthinned Slash Plantations...Pulpwood, Sawtimber and Gum," from Forest Service Research Paper SE-35, by Bennett and Clutter.

of land ownership and distances to mills influence these prices along with accessibility, volume, method of cutting, quality of the raw product and other factors.

While the stumpage price reflects value for all forest products in a county, pulpwood prices, deserve the most emphasis. They are valuable for their relative stability over the years and for their strong influence on the wood-using industries.

A county's final stumpage figures for forest land valuation should be established jointly by the county property appraiser and the Department of Revenue. However, the Department obtains current, local stumpage prices each year from property owners, industry representatives, timber brokers, the Division of Forestry and other sources of reliable sales information. The final price figures should be consistent, in the manner derived and by definition, with the figures used in preceding years.

Forest Management Expenses.--Forest management costs associated with timber operations are of two types: annual recurring expenses and improvements to the land. The prorated (cost/rotation age) costs of site preparation and planting are the only improvements to land that should be included. Forest maintenance and protection from insects, disease, fire and natural disasters are annual management costs.

The Department of Revenue derives management costs from data supplied to the Florida Division of Forestry by industry and private forestry operations in individual counties. This data is interpreted and adjusted in the same manner as stumpage prices. The Department of Revenue provides an average cost to the county property appraiser for use in the valuation of timberland.

The annual management cost does not include ad valorem taxes. They are factors of the capitalization rate.

Capitalization Rate.--Shows the relationship between net income from the land and the value of the land. Use three basic methods to determine the proper capitalization rate in the appraisal process: (1) band-of-investment, (2) market comparison, and (3) summation. Each approach has its own confines.

The band-of-investment technique uses mortgage debt financing information to determine a capitalization rate by weighting the fractional rate of mortgages and equity. Difficulty of getting mortgage debt financing information on specific contracts limits this technique.

The market comparison technique attempts to establish a capitalization rate by dividing the net income by the sales price, the proxy for value. While sales prices representing agricultural value are sometimes difficult to find, the real drawback of this approach is that income data is private and nearly impossible to secure. Given this lack of market and income information, the band-of-investment and the market comparison methods may not be practical to use. If such data are available in a particular county, either of these techniques is recommended.

The summation method is used when the first two techniques are impractical. The summation method is, however, the only one of the three which is not primary. That is, this approach leads indirectly to the determination of a capitalization rate. With this approach, four individual components are determined and summed to derive a capitalization rate. The components are: safe rate, risk rate, illiquidity rate, and management rate. They can be determined to some extent by studying the money market. Information useful in this regard is published monthly in the Federal Reserve Bulletin.

The rate determined by any of the above methods is next added to the individual county ad valorem millage rate, expressed as a percentage, to establish the final capitalization rate to be used. This procedure is repeated each year.

#### Table of Values

Because of the larger number of parcels of property to be valued by the property appraiser each year, it is impractical, if not impossible, for a value to be set on each parcel in the manner of a fee appraisal. Therefore, the property appraiser uses the mass appraisal technique to set values on property in the county. Rather than valuing each individual parcel, the appraiser determines a value for several classes of property. The classifications are based on productivity. Adjustments may be made if the appraiser determines that a particular parcel varies significantly from the norm.

The county property appraiser should establish value tables for the site index ranges within the county. The timberland classes with their respective site index ranges are:

<u>Class</u>	<u>Site index (50-year slash)</u>
Timberland 1	90 and above
Timberland 2	80-89
Timberland 3	70-79
Timberland 4	60-69
Timberland 5	50-59

Values should also be determined for the following classes when appropriate: Hardwood or pine-hardwood timberland classified by the percentages of the above index classes, i.e., Timberland #2, 75 percent. The two other classes are Swamp and Nonproductive lands.

Pine classifications should be separated into the use categories of natural pine and planted pine. These two methods of forest management are readily discernible on the ground and by the use of aerial photography. The two methods differ in yields, prices paid, and costs of establishment and maintenance. Use the yield figures given in table 11 for related use category (planted, natural) and site index to construct a value table. Yield and cost figures for use category and site index

would be consistently applied. The stumpage prices used in the calculation would be the same for both and be derived as stated previously in the section on stumpage prices.

The construction of local county value tables for the five site index categories is predicated on reasonable forest management practice in regard to the number of stems per acre. The rotation age used to develop value tables reflects the most consistent rotation periods in the particular counties by prudent forest land managers. Table 12 shows an example of a value table.

A non-pine table of value is included for hardwood and swamp land based on potential, local prices, costs and market information. Because hardwood forests are rarely managed in Florida, they may be best represented by a percentage of pine valuation if on a good pine site. However, much of the forest land that will be classed as hardwood will be productive swampland in most counties. See table 13.

Nonproductive lands have some value and may contribute to the value of surrounding woodlands, but obviously are not subject to valuation by the income approach. The property appraiser therefore values this land according to its contribution to the surrounding productive woodlands.

Production, income, expense, acreage, and other data should be based on a typical operation. Typical is defined as that which most frequently exists or occurs in the particular situation or area under consideration. A typical agricultural operation may be confined within one county or extend to several counties.

To minimize the effect of the wide fluctuation of data used in developing the tables of values and to provide a measure of stability to the resulting values, review the figures for several years of historical data on costs and income. However, when historical data or research on a particular technique is lacking, the Department recommends the use of a simple 5-year moving average until more data or research are available.

Data used in this section were obtained from the Florida Department of Agriculture, the Institute of Food and Agricultural Sciences, USDA publications, and other sources.

Table 12. - Value table

Management cost			County cord price
Natural	A		County cap rate
Planted	B		
		Site Index (50 years)	
		Classification	
			gross income
			=
		Yield x price/cord	cost
			=
			net income
			% cap rate
			% value
Timberland No. 1	90+		
Natural	95 Avg.	1.62 x	
Planted		1.98 x	
Timberland No. 2	80-89		
Natural	85 Avg.	1.28 x	
Planted		1.48 x	
Timberland No. 3	70-79		
Natural	75 Avg.	1.00 x	
Planted		1.10 x	
Timberland No. 4	60-69		
Natural	65 Avg.	.75 x	
Planted		x	
Timberland No. 5	50-59		
Natural	55 Avg.	.55 x	
Planted		x	

Table 13.--Non-pine value

Class	Physical characteristics	Value
Hardwood	Hardwood or pine-hardwood mixtures on sites subject to stand conversion; high hammocks	75 percent of value for slash pine site index
Swamp	Stream and river bottoms that flood; stream margins, bays, cypress ponds, swamp	\$30      Average value calculated from: a .4 cord per acre per year growth rate; \$7.50 cord stumpage rate; management cost of \$.25 per acre per year cap rate 10 percent <sup>1</sup>
Nonproductive	Permanent open bogs; permanent open water; borrow pits; rights-of-way highway pipe and powerline; salt water marsh; spoil, dumps and pits	See General Provision Section

<sup>1</sup> Growth and management figures from Florida's Timber, 1970, USDA Forest Service Resource Bulletin SE-20.

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GEORGIA<sup>36</sup>

All tangible property, including forest land and timber, is assessed for property tax purposes on the basis of its fair market value. At this time, the State does not provide local assessors with any special instructions for appraising forest property. However, the State Department of Revenue is working to develop a simplified procedure of forest valuation that can be used by local assessors who have no forestry training. The Department expects to have results of this study ready for publication by late 1978.

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<sup>36</sup>Department of Revenue. 1978. Personal correspondence.

## HAWAII

Hawaii has three provisions that affect the assessment of forest land and timber: (1) land use districts established by the Land Use Commission,<sup>37</sup> (2) tree farm classifications,<sup>38</sup> and (3) surrender of private lands as forest reserves.<sup>39</sup>

Land Use Districts

The State has developed a land use commission that has the power to zone lands to encourage their development for the uses to which they are best suited. All lands are placed in four major land use districts: urban, rural, agricultural, and conservation.

Permissible uses within the agricultural districts include, but are not limited to, forestry and open recreational facilities. Conservation districts include areas necessary for protecting watersheds and water sources; preserving scenic areas; providing park lands, wilderness, and beach reserves; conserving endemic plants, fish, and wildlife; preventing floods and soil erosion; forestry; other related activities; and other permitted uses not detrimental to a multiple use conservation concept.

Upon the adoption of district boundaries, maps showing the land use district boundaries are filed with the Department of Taxation. Thereafter, land within each district is assessed with consideration given to the use or uses that may be made of the land, consistent with the district classification, as well as to the uses to which it is then devoted. Land that is classified and used as agricultural is appraised on the basis of its value in agricultural use without regard to any value that the land might have for other uses. Trees planted for timber production are treated as a growing crop and are excluded from property taxation.

The following factors are considered in determining the value of agricultural lands: rent; productivity; nature of actual agricultural use; the advantages or disadvantages of factors such as location, accessibility, transportation facilities, size, shape, topography, equality of soil, water privileges, availability of water and its costs, easements and appurtenances; and the opinions of persons having special knowledge of land values.

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<sup>37</sup> Revised Statutes, Sec. 205-1 through 205-16.

<sup>38</sup> Op. Cit., Sec. 186-2 through 186-12.

<sup>39</sup> Op. cit., Sec. 183-15 through 183-20.

The Department of Taxation provides maps of each taxation district drawn to appropriate scale. The maps show property lines and their areas or dimensions, numbered or otherwise designated in a systematic manner for convenience of identification, valuation, and assessment. The maps, as far as possible, show the names of owners of each tax parcel of land. The Department also maintains that when such information is available, maps show present use, zoning, and physical use capabilities of land within each taxation district for the guidance of assessors.

### Tree Farms

Forest lands that qualify and are classified as tree farm property are not subject to the real property tax. Instead, a yield tax is assessed and collected from owners of the trees. The tax equals 5 percent of the stumpage value of the merchantable timber harvested. Eligible properties for tree farm classification must contain at least 30 acres and be suited for the raising of trees of commercial species in a quantity sufficient to establish a timber business. The land must not be suited for some higher or better use. Property on which the owner is already growing trees of a commercial species under good forest management practices, and which the owner agrees to manage in accordance with the rules and regulations prescribed by the Board of Land and Natural Resources, may also be classified as tree farm property. The agreement must be for a period of at least 30 years.

In the event that land classified as tree farm property is declassified, the Department of Taxation cancels the exemption from property taxes, retroactive to the date that the property became exempt. Furthermore, the property taxes that would have been due (but for the exemption) for all of the years that the exemption was in effect, become due and payable with a 5 percent per annum penalty from the respective dates that those payments would have been due.

### Forest Reserves

Land that is surrendered to the State as forest or water reserve land is exempt from the real property tax. The owner of the land must surrender to the State the care, custody, and control of the land. The agreement may reserve all, some, or none of the rights to the water on the surrendered land to the owner. The State may improve the land during the surrender period and hold title to the improvements that are made.

If the lands are withdrawn from the agreement without the consent of the Department of Land and Natural Resources before the expiration of the 20-year period, the tax exemption privilege will be cancelled retroactive to the date of the surrender agreement. All taxes that would have been due if the property had not been surrendered will become due and payable with a 5 percent per annum penalty from the respective dates that these payments would have been due.

## IDAHO

In general, forest property is subject to an ad valorem property tax under the provisions of Idaho Code 63-108.<sup>40</sup> In effect, this law states that timberland value, for assessment purposes, is to be based upon its productivity. An income approach is used to determine this productivity value. Mature (merchantable) standing timber is also assigned a discounted value. The present worth of mature timber must allow for a reasonable holding period. Reproduction (young growth) up to 12.5 inches d.b.h. and certain prescribed seed trees are exempted from taxation.

Definitions

Standing Timber.--Mature timber growing upon the land where the title has been separated, or is in the process of being separated from the land.

Timberland.--Land bearing or capable of bearing timber of commercial character that is economically available now or in the future for commercial use and not otherwise withdrawn from such use. (Old-field farm land in the process of reversion is included in this classification.)

Property that fits either of the definitions above may have many uses and benefits. Therefore, this classification is not limited to, but ordinarily includes, those lands producing timber, as defined, which may or may not be associated with: (1) dry grazing or its potential use; (2) roadways (except public), as they lend utility and accessibility; (3) reservations and easements; (4) recreational leases; or (5) crusher rock, gravel, borrow pit material and minerals unless otherwise withdrawn.

Tracts 10 acres in area are ordinarily considered to be a minimum economic logging unit in timberland status. Such land may contain a dwelling and outbuildings. Their use may be either permanent or occasional. However, timberlands in the process of subdivision for recreational development or other use lose their status as timberland. Timberlands exceeding 10 acres in area may also lose their status when it is determined that other uses, including subdivision into home and recreational sites, are paramount to the timberland use.

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<sup>40</sup> Tracts classified as reforestation lands under Idaho Code 28-201 through 38-221 are taxed at local rates on fixed assessments of \$1 per acre in lieu of the ad valorem assessments. The timber thereon is subject to a yield tax of 12.5 percent of the stumpage value at the time of harvest. According to the Idaho State Tax Commission, only 6.13 percent of the State's forest land area is classified under these provisions.

### Timberland Classification

Timberland is appraised for its productivity. To foresters, this productivity is best expressed in site quality categories. There are six site quality categories which are grouped into three productivity classes:

Good productivity class.--Timberland having a mean annual increment (MAI) of 350 board feet per acre, based on a 70-year rotation and 75 percent of normal stocking by the end of the rotation period. This productivity class includes western white pine in site class I and the better site class II; and ponderosa pine site class I, II, and upper site class III. The MAI of 350 board feet per acre is used in the evaluation formula.

Medium productivity class.--Timberland having an MAI of 225 board feet per acre, based on a 70-year rotation and 75 percent of normal stocking by the end of the rotation period. This productivity class includes fair western white pine site class II and ranges through site class III; and ponderosa pine from lower site class III through site class IV. The MAI of 225 board feet per acre is used in the evaluation formula.

Poor productivity class.--Timberland having an MAI of 100 board feet per acre, based on a 70-year rotation and 75 percent of normal stocking by the end of the rotation period. This productivity class includes western white pine site classes IV and V, and ponderosa pine site classes V and VI. The MAI of 100 board feet per acre is used in the evaluation formula.

Lands not having a productivity of western white pine site class V or ponderosa pine site class VI are not considered forest type land, and are assessed under other provisions governing the ad valorem taxation of real property.

The appraising technician determines the site class of a particular parcel of timberland by noting annual ring counts from increment borings and stumps, internode spacings, vegetative indicators, tree heights, available moisture, and soil depth and texture of soil profiles.

### Appraisal

The income approach to value applies to income-producing property, including timberlands. The income approach outlined below looks only to short term duration (no longer than 5 years). It is based upon the net income earnings. A minimum of six steps are required to arrive at the final estimate of the value of forest land:

1. Estimate gross earnings based on site classes.

Data are needed with respect to timber growth, stumpage rates by zones, grazing fees, easement fees, special use fees, and other sources of income.

The State Tax Commission prepares and distributes to each county assessor and each board of county commissioners within the State, rules and regulations describing and directing the manner in which the value of property is to be determined for the purpose of taxation. County assessors value forest property within their counties according to the following appraisal methods and techniques as set by the Commission.

2. Estimate costs.

Costs include those attributable to management, established at 5 percent; regeneration and silvicultural operations, amortized over a 70-year rotation period (also allowed for natural regeneration); fire protection; and insect and disease control.

3. Convert gross economic earnings to net earnings.

4. Review financial marketing conditions to develop the capitalization rate.

5. Apply the capitalization rate to the net earnings to determine the value of the forest land.

$$\text{Value} = \frac{\text{Net earnings}}{\text{Capitalization rate}}$$

6. Add the discounted value of the mature standing timber on the land.

The selection of a capitalization rate is important. The band-of-investment method is used to select a composite interest rate from the financial market. The tax rate is added to the composite rate, which results in the capitalization rate.

The cost of borrowing money and the percentage of the purchase price that may be borrowed in a normal transaction must be currently maintained. It is necessary to know what percent of the property is in an equity position or what rate of return is expected by this position. For example:

First mortgage loan ratio to value	= 70 percent x cost rate 7 percent = 4.9 percent
Equity prospect to value	= 30 percent x return 9 percent = 2.7 percent
Indicated band of investment composite rate	7.6 percent
Add: Tax rate (assessment ratio x mill levy)	0.9 percent
Capitalization rate for example . . . . .	8.5 percent

The following example of the valuation process is representative of northern Idaho.

Estimate of Timber Reproduction Land  
and Timberland Value

1. Gather Data on Stumpage Values.

Listing of State (zoned)<sup>41</sup> stumpage sales cut  
from July 1, 1968 to June 30, 1972

State timber cut	Ponderosa Pine and mixed species		Mixed species		White pine and mixed species		All species	
	7/1/68- 6/30/72	Rate Vol per (MBF)	Rate Vol per (MBF)	Rate Vol per (MBF)	Rate Vol per (MBF)	Rate Vol per (MBF)	Rate Vol per (MBF)	Rate Vol per (MBF)
	644	\$11.20	17,563	\$10.95	3,661	\$12.85	21,868	\$12.70

Discounted Stumpage Values<sup>42</sup>

Ponderosa pine and mixed:	$\$11.20/M \times .3479 = \$3.90$ called $\$3.90/M$
Mixed species:	$\$10.95/M \times .3479 = \$3.81$ rounded to $\$3.80/M$
White pine and mixed:	$\$12.85/M \times .3479 = \$4.47$ rounded to $\$4.45/M$
All species:	$\$12.70/M \times .3479 = \$4.42$ rounded to $\$4.40/M$

<sup>41</sup>Includes Shoshone, Benewah, Latah, and Clearwater Counties.

<sup>42</sup>The discounted value of mature timber should allow for a reasonable holding period and for an element of risk. The discounting factor used here was derived in the following manner:

$$\text{Discounting factor} = [1/(1+i)^n] (1 - RF)$$

where: i = interest rate expressed as a decimal  
n = number of years until harvest  
RF = risk factor expressed as a decimal

Assuming a typical cutting cycle of 24 years, the average holding period for randomly selected tracts at any given time is 12 years. The State Tax Commission uses an interest rate of 6 percent and allows for a 30 percent reduction in value due to risk. Therefore, the discounting factor equals  $0.70/(1.06)^{12} = 0.3479$ .

2. Calculate Annual Per Acre Gross Earnings.

Earnings attributed to timber production:

Good production	451 B.F. <sup>43</sup>	x	\$12.70/M <sup>44</sup>	=	\$5.73/acre
Medium production	278 B.F.	x	12.70/M	=	3.53/acre
Poor production	106 B.F.	x	12.70/M	=	1.35/acre

Other earnings: Grazing fees at \$.33/acre/season. (This is an average from government agencies)

Total earnings:

Good productivity	\$5.73 + \$.33 = \$6.06/acre
Medium productivity	\$3.53 + \$.33 = \$3.86/acre
Poor productivity	\$1.35 + \$.33 = \$1.68/acre

3. Determine Annual Costs.

	<u>Good</u> <u>Prod.</u>	<u>Med.</u> <u>Prod.</u>	<u>Poor</u> <u>Prod.</u>
Protection	\$ .20	\$ .20	\$ .20
Regeneration and cultural	1.00	.50	-
Disease and insect control	.15	.10	.05
Management (5 percent of earnings)	.30	.19	.08
—	—	—	—
Total/acre costs	\$1.65	\$ .99	\$ .33

4. Compute Net Earnings Per Acre Per Annum.

Good productivity	\$6.06 gross less \$1.65 expenses = \$4.41
Medium productivity	3.53 gross less 0.99 expenses = 2.54
Poor productivity	1.68 gross less 0.33 expenses = .35

5. Develop the Capitalization Rate.

Band-of-investment-method:

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<sup>43</sup>Mean annual increment for the respective productivity class (see Timberland Classification section).

<sup>44</sup>Zone stumpage rate from step 1 of this example.

Mortgage position 70 percent x 7 percent going interest rate = 4.9 percent  
Equity <sup>45</sup> position 30 percent x 9 percent going interest rate = 2.7 percent  
County tax rate 17.6 percent x 8 (assmt. x levy) = 1.4 percent

Total . . . . . = 9.0 percent<sup>46</sup>

#### 6. Derive Final Estimate of Land Value.

Good production land = \$4.41      9.0 percent = \$49.00/acre  
 Medium production land = \$2.54      9.0 percent = \$28.22/acre  
 Poor production land = \$1.35      9.0 percent = \$15.00/acre

Rounded;

Good production land = \$49.00/acre  
Medium production land = \$28.00/acre  
Poor production land = \$15.00/acre

## 7. Find Final Appraisal Value.

Add the discounted value of the standing mature timber (equal to the discounted stumpage values computed in step 1, multiplied by the volume of timber on the land) to the value of the land to arrive at the final appraised value of the forest property.

<sup>45</sup>Equity normally expects a 2.0 percent greater return on their investment than the mortgage position.

#### 46 Rounded.

## ILLINOIS

In general, forest land is assessed at 33-1/3 percent of its fair market value; however, forest land that is part of a farm may qualify under the agricultural assessment law<sup>47</sup> when the owner files for dual assessment. This law assesses the land on the basis of 33-1/3 percent of the property's fair, cash value in addition to the fair market value of such property. The fair cash value is the price that the property would bring at a fair, voluntary sale for use by the buyer for farming or agricultural purposes.

The following methodology is used to determine the value of forest land as an income producing property.

Procedure for Appraisal of Merchantable Timber<sup>48</sup>

The base value of merchantable timberland on any tract is determined by adding the value of merchantable timber to the land capability value as described in the preceding paragraph on rural land valuation.

The general practice provides that merchantable timber is not valued separately unless such tracts have pole size and saw log size stands and are used exclusively to grow timber. Thus, young timber or small windbreaks and cattle shelter timber tracts are not considered in valuing merchantable timber.

The value of merchantable timber depends on the kind, size, and acreage of such trees. While small growing stock has some value separable from the land, such value cannot be realized without reducing the productive value of the timberland. Therefore, the smaller trees should be included in the valuation of the land, and a separate value should be added only for pole size and saw log stands of merchantable timber.

Following are the main steps for the appraisal of such merchantable timber:

1. Determine the approximate number of acres which are covered with merchantable timber. Aerial photographs, in addition to field checks, furnish this information and the use of a planimeter or grid gives the number of acres.

<sup>47</sup> Chapter 120, Section 501a-1.

<sup>48</sup> Real Property Assessment Manual. 1952. Department of Revenue, Property Tax Division. p. 53. This material was included in "State Guides for Assessing Forest Land and Timber--1966" and, even though it is no longer published in any of Illinois' assessment manuals, it is still used in valuing forest property.

2. Determine the estimated number of pole size and saw log stands of trees in each acre of the tract. Again, the aerial photographs and the field inspection assist in furnishing information on the number of acres in such mature trees.
3. Multiply the total number of acres having such merchantable timber on the tract by the average value per acre. The average value per acre is estimated according to the quality and average number of pole size and saw log stands per acre.
4. Add the total value of the merchantable timber on the tract to the base land capability value to obtain the total value of the tract.

The Department gives assessors technical assistance on the valuation of merchantable timber upon request.

## INDIANA

In general, agricultural lands, including some woodlands, are valued according to their soil productivity. Statutes contain provisions for classifying certain types of forest lands as native forest, or as forest plantations. For general property taxation purposes, they are assessed at \$1 per acre.

### Land Valuation: Farmland<sup>49</sup>

#### The Soil Productivity Method

The value of agricultural land in Indiana is directly related to its capacity to produce crops and income. Thus, soil productivity is a prime consideration. The soil productivity method involves the identification of agricultural tracts using interpretation data from soil maps. Some counties have detailed soil maps, others have general soil maps and data. The proper use of soil maps, interpretation data, and unit values results in greater uniformity when applied to the appraisal process of agricultural lands for ad valorem tax purposes. Detailed soil data and maps from soil surveys are used in counties where

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<sup>49</sup>Real Property Manual for Indiana.

available. General soil data maps and identities for agricultural land is furnished in all other counties by the State Board of Tax Commissioners. The productivity factors applicable to the particular soil types and associations are provided for each county. To determine the relative productivity of soils:

1. Obtain soil maps that have an assigned corn yield in bushels per acre for cropland as prescribed by the State Board of Tax Commissioners. The mapping units are delineated to provide the basis for soil use and corn yields.
2. Determine whether the land type is open tillable, open non-tillable, or wood/wasteland. (Wood/wasteland--Land not cleared of trees and brush, therefore being unsuitable for cultivation, or unused land not capable of being used economically. Note: Assessor should reassess if this land type changes, e.g., timber is cut, flooding controlled, standing water drained, etc.)
3. Determine soil identity from maps.
4. Measure and record acreage of each soil-use mapping unit category for each tract.
5. Determine the corn yield as prescribed for each soil identity. This translates into a factor to apply to the base rate of \$450, which is the prescribed True Cash Value of land capable of producing 100 bushels of corn per acre. (Example: 90 bushels =  $0.90 \times \$450 = \$405$ ; 125 bushels =  $1.25 \times \$450 = \$563$ .)
6. Influence factors are 100 percent for open tillable land, 60 percent reduction for open non-tillable, and 80 percent reduction for wood/wasteland. Note: Land underlying and surrounding outbuildings, farm ponds, etc., shall be valued as contiguous land by appropriate soil identification.

#### Assessment of Certain Forest Lands<sup>50</sup>

Qualifying land may be classified as native forest land or as a forest plantation. Land so classified is assessed at \$1 per acre for general property tax purposes.

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<sup>50</sup>Acts of 1975, Public Law 47, Title 6, Chapter 6, Section 1 through 27.

Qualifications

Land may be classified as a forest plantation if (1) it is cleared land which is stocked with a good stand of timber-producing trees as competent foresters understand this concept, or (2) it has never been plowed or cultivated and contains at least 40 square feet of basal area per acre, or at least 1,000 timber-producing trees of any size per acre. According to the statutes, dogwoods, water beech, iron wood, redbud, sassafras, persimmon, pawpaw, black haw, willows, pomaceous trees, and Christmas trees which are grown for commercial purposes are not considered timber producing trees.

A parcel may not be classified as native forest land or as a forest plantation if:

1. It contains less than ten acres (applied to land classified after July 26, 1967).
2. A dwelling or other building is situated on the parcel (excludes buildings utilized by the landowner for the purpose of maintaining a sugar camp or operating a sawmill).
3. It is grazed by a domestic animal (excludes domestic fowl if they do not have a detrimental effect on timber production).
4. It contains an open area (excludes open areas less than 1 acre authorized by the state forester).

Owners and persons controlling land classified as native forest land or as a forest plantation are required to follow the minimum standards of good timber management prescribed by the Department of Natural Resources. Applications for classification as native forest land or as a forest plantation must be submitted to the state forester for approval. The auditor of the county in which the land is located is notified of approved applications.

Assessment

Even though classified land is assessed for general property tax purposes at \$1 per acre, it must also be assessed by the county assessor at its fair market value. This assessment includes any mineral, stone, oil, or gas value that the land may have. The county assessor does not consider the standing timber on the land in making the assessment.<sup>51</sup> Appeal provisions are provided for the landowner if the assessment is unsatisfactory.

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<sup>51</sup> Sec. 10-a, b, of Public Law 47.

The fair market value of the land is recorded and is used in calculating penalty (roll back) taxes to be levied if the use of classified land changes. The provisions for determining the amount to be paid will be discussed later.

If any oil, gas, stone, coal, or other mineral is obtained from classified land, the parcel shall be immediately assessed for the oil, gas, stone, coal, or other mineral wealth. A landowner or the state forester may withdraw land from classification as native forest land or as a forest plantation. The state forester may do so if the provisions of this chapter are not followed, and if the owner refuses to make the changes necessary for compliance. The county assessor for the county in which the land is located will be notified if a parcel of land is withdrawn. The county assessor will then assess the land in the manner prescribed in the law.<sup>52</sup>

When classified land is withdrawn, the state forester immediately notifies the recorder and the auditor of the affected county. In addition, the owner of the land makes a notation of the withdrawal in the records of the county recorder and pays an amount equal to the lesser of:

1. the total property taxes that, if it were not for the classification, would have been assessed on the land during the lesser of:
  - A. the period of the classification; or
  - B. the 10-year period immediately preceding the date on which the land is withdrawn from the classification, plus interest on the property taxes at the rate of 5 percent per year; or
2. the remainder of (a) the withdrawal assessment of the land, minus (b) the sum of:
  - i. the initial classification assessment of the land; and
  - ii. any increase in the initial classification assessment of the land resulting from subsequent construction of a ditch or levee.

For the purposes of this section, "initial classification assessment means the assessment required under section 10 of this chapter, and the term "withdrawal assessment" means the assessment required under sections 20 and 21 of this chapter.

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<sup>52</sup>Section 10(b) of Chapter 6, Sec. 20 and 21, Title 6 of Public Law 47.

## IOWA

Lands that are classified as forest reservations are assessed for property tax purposes at \$14.82 per acre per year.<sup>53</sup> To qualify for this special assessment a tract of land must:

- A. consist of at least two continuous acres,
- B. contain at least 200 growing forest trees on each acre,
- C. contain no buildings or improvements (excluding fences), and
- D. not be accessible to livestock.

No more than one-fifth of the total number of trees in any forest reservation may be removed in any year. Persons seeking this special assessment must file annual applications with the assessor.<sup>54</sup>

In all other cases where trees are planted upon any tract of land, without regard to area, for forest, shade, ornamental, or for windbreak purposes, the assessor will not increase the valuation of the property because of these improvements.<sup>53</sup>

Forest and timber lands not qualifying for the special treatment as forest reservations are generally assessed as agricultural land. In determining the value of agricultural properties, assessors give equal consideration to the properties' productivity and market value.<sup>55</sup>

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<sup>53</sup>Iowa Code, Section 441.22.

<sup>54</sup>Op. cit., Sections 161.2 to 161.13.

<sup>55</sup> Bair, G.D. 1977. Personal correspondence. Iowa Department of Revenue.

KANSAS<sup>56</sup>

Each parcel of real property is appraised at its fair market value in money and assessed at 30 percent of this value for property tax purposes. Fair market value in money means the amount of money that a well-informed buyer is justified in paying and a well-informed seller is justified in accepting, assuming that both parties are acting without undue compulsion and that the property has been offered at the market place for a reasonable length of time. The price at which a parcel of real property sells at an auction or forced sale shall not be taken as criterion of such value.

The fair market value of a parcel of property is determined by the county appraiser from actual view and inspection of the property. Sales in and of themselves are not the sole criterion of this value, but are used in connection with cost, income, and such other factors as may be appropriate, including but not limited to the following:

1. the proper classification of lands and improvements;
2. the size;
3. the location;
4. depreciation, including physical deterioration or functional, economic or social obsolescence;
5. cost of reproduction or improvements;
6. productivity;
7. earning capacity as indicated by lease price or by capitalization of net income;
8. rental or reasonable rental value;
9. sale value on open market with due allowance to abnormal inflationary factors influencing such values; and
10. comparison with values of other property of known or recognized value. The ratio study shall not be used for appraisal purposes.

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<sup>56</sup>K.S.A. 79-501, K.S.A. 79-503, and K.S.A. 79-1439.

## KENTUCKY

Under the Kentucky Agricultural and Horticultural Assessment Act all agricultural and horticultural land is assessed for ad valorem tax purposes according to its income producing capability in its current use rather than on any potential value that it may have. Land used to grow timber is classified as agricultural land and is assessed under the provisions of this law.<sup>57</sup> Timber is not valued separately unless such tracts have pole size and saw log size stands and are used exclusively for the growing of timber.

While young, small growing stock has value separable from the land, it cannot be realized without reducing the productive value of the timberland. Therefore, the smaller trees are included in the valuation of the land, and a separate value is added only for pole size and saw log stands of timber.<sup>58</sup> The value of timber depends on the kind and size of trees and the number of acres of such trees. The main steps for the appraisal of merchantable timber are:

1. Determine the approximate number of acres which are covered with merchantable timber. Aerial photographs, in addition to field checks, furnish this information and the use of a planimeter or grid gives the number of acres.

2. Estimate the number of pole size and saw log stands of trees in every 1/5 acre (93 feet square or a circle with 52.7-foot radius) of the tract. The aerial photos and the field inspection will assist in furnishing information on the number of acres of mature trees. Multiply the 1/5 acre counts by 5 to make estimates per acre.

3. Multiply the total number of acres having merchantable timber on the tract by the average value per acre. The average value per acre is estimated according to the quality and quantity of the stand. Accessibility is of prime importance and deductions should be made to reflect the added cost of removing timber from inaccessible places. Presence of public roads, rail or water transportation considerably improves marketability.

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<sup>57</sup> State Department of Revenue. Personal correspondence. January 13, 1977.

<sup>58</sup> Kentucky Property Assessment Administration Manual. Department of Revenue. 1958, rev. 1963. pp. 4.22-4.23.

## Determining the Quantity of Marketable Timber<sup>59</sup>

The following pages outline the general procedure used by professional timber appraisers for valuing marketable timber. This procedure should not be used by the inexperienced without the assistance of a qualified appraiser. It is included in this manual to point up the complexity of timberland appraising and for educational purposes.

To be classified as sawtimber, soft woods (pines, cedar, hemlock, spruce) must be at least 9 inches d.b.h., and hardwoods 11 inches d.b.h. To be classified as pole timber, softwood should be 5 to 9 inches d.b.h. and hardwood 5 to 11 inches d.b.h. The term pole timber is simply a measuring term and does not refer to the use which will be made of the timber. Pulpwood, for example, falls in the "pole timber" classification. Unlike sawtimber, which is measured in board feet, pole timber is measured by the cord. Also, oak used for cooperage purposes is measured in "bolt feet". Cooperage timber is cut to approximately 39 inches in length. A stave bolt cut to this length and measuring 12 inches from outer corners of the sapwood would contain 1 bolt foot. Heading bolts are cut in 24-inch lengths. Trees less than 12 inches in diameter should not be cut for this purpose. To convert board feet to bolt feet or vice versa, a 1,000-board-foot log is assumed to be the equivalent of 100 bolt feet, or a sufficient quantity to make 10 barrels.

An accurate appraisal of standing timber involves a careful inspection of the trees and estimation of the board footage or cordage that it will produce. In the valuation of small timber tracts, all trees of marketable size are measured if possible. However, for mass appraisal purposes of even the smallest tracts this is often impractical. For this reason some simpler method which will still give a reasonable estimate must be followed. The recommended procedure is to establish an acreage value based on a typical acre in the tract. To do this, a general review of a large portion of the tract must first be made for determination of species and average size of the marketable trees. Sample areas of normal growth and density can be selected, either small measured plots (1/5 acre) or strips, and an accurate measurement of the trees within these areas made as a guide to valuation of the entire tract. Board footage estimates may be made through measurement of the diameter and usable height. The diameter is measured at breast height (d.b.h.) and usable height from approximately 1 foot above the ground (stump height) to about where the trunk is broken by large branches or where the minimum diameter is approximately 9 inches.

The simplest method of measuring the diameter is by measuring around the tree and dividing the circumference by three. (The exact division is 3.1416; however, three gives an answer within standards of accuracy.)

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<sup>59</sup>The following material is taken from The Real Property Appraisal Manual, Dept. of Revenue, pp. 93-97. 1962.

Several methods can be employed to measure the point at which the maximum usable height of a tree occurs. One, the point where the trunk either forks or is broken by large branches has already been mentioned. Another method used by some estimators is the formula, [(circumference in inches at BH x 0.28) - 2 inches], which gives the diameter inside the bark at the top of the first 16 foot log. Deduction of 2 inches for each additional 16 feet of length gives the diameter at the top of each additional log. For example, the calculation of a tree 18 inches d.b.h. (circumference =  $18 \times 3.1416 = 56.5$ ) is as follows:

$(56.5 \times .28) = 15.8 - 2 = 13.8$  inches diameter inside bark at top of the first 16-foot log. At the top of the second log, or 32 feet, the diameter would be 13.8 inches - 2 inches or 11.8 inches.

One of the simplest methods of measuring the usable height is based on similar isosceles triangles. In measuring the height, a stick, slightly longer than the arm (with arm fully extended, end of stick should just touch eye) is held at arm's length in a vertical position. When at a distance where the stump height of the tree may be seen over the top of the hand, and the top of the usable length of the tree can be seen over the top of the stick, the distance from the tree will equal the height of the tree. (Note: The head should not be moved when sighting the upper and lower limits of the tree.) Figure 7 illustrates the use of this method.

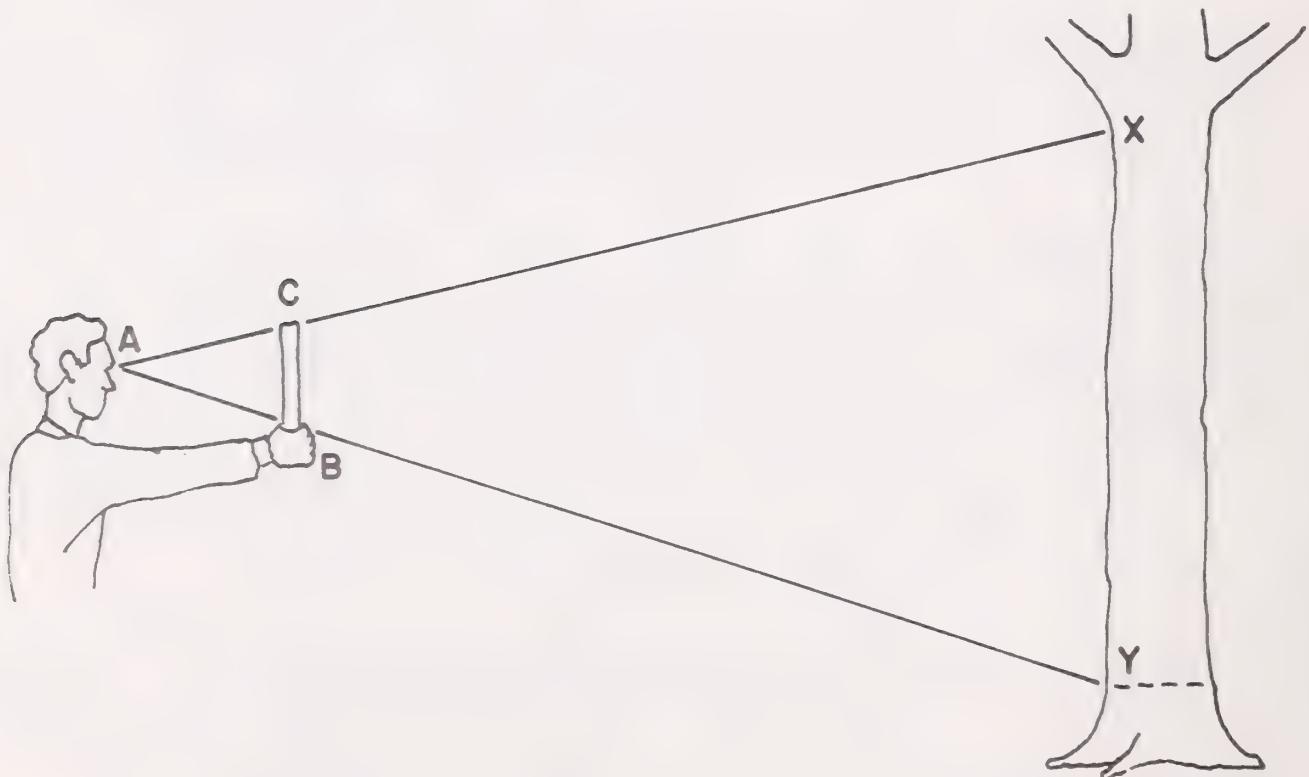


Figure 7.--In measuring the height of usable wood in a tree, AB and BC are equal; therefore, AY' and XY' are equal.

After the diameter and height are determined, the board content of the included trees can be estimated by use of the following volume table.<sup>60</sup> This table is based on the average volume in a large number of trees. The height is indicated in half-logs or 8-foot units. It is also based on a minimum inside bark diameter of 8 inches top diameter.

The following table may be used in estimating the cordage obtainable from one acre of pole timber.

Number of trees to make one cord, by d.b.h.

d.b.h.	Number of trees
5	42
6	22
7	14
8	10
9	7
10	6

In using the sample plot (1/5 acre) method, a tally sheet which provides for recording the diameters, heights and species of the trees is necessary. Upon completion of the measurements, the number of trees in each species of similar size are combined for easier calculation of total per acre and the board content.

For example:

$$\begin{aligned} 5 \text{ trees } 18 \text{ inches in diameter } \times 5 &= 25 \text{ trees} \\ 10 \text{ trees } 12 \text{ inches in diameter } \times 5 &= 50 \text{ trees} \\ 15 \text{ trees } 8 \text{ inches in diameter } \times 5 &= 75 \text{ trees} \end{aligned}$$

The board footage would be calculated as follows: (All trees of the same diameter are assumed to be of equal height in this example.)

$$\begin{aligned} 25 \text{ trees, } 18 \text{ inches in diameter, } 32 \text{ feet high } \times 221 &= 5,525 \text{ board feet} \\ 50 \text{ trees, } 12 \text{ inches in diameter, } 24 \text{ feet high } \times 70 &= 3,500 \text{ board feet} \\ 75 \text{ trees, } 8 \text{ inches in diameter (pole) } 75 &\quad 10 = 7-1/2 \text{ cords} \end{aligned}$$

If the tract being appraised contained 20 acres of timber, the total volume would be:

Saw timber:  
 $20 \text{ acres } \times 9,025 = 180,500 \text{ board feet}$

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<sup>60</sup> The Real Property Appraisal Manual includes a volume table that lists board feet (International 1/4-inch log rule for form class 78) by diameter and height. The table is not reproduced in this summary.

**Pole timber:**

20 acres x 7-1/2 cords = 150 cords

The valuation of the timber tract is completed by applying average acre values developed from market data on the going rate or rates for timber of the species and general log size contained in the tract to the total timber acreage.

**Content of Stand:**

180,500 board feet of saw timber, one-half good quality, one-half medium or below, white oak, pine and hemlock mixed. 150 cords of mixed pulpwood.

**LOUISIANA**

Act 702<sup>61</sup> provides that bona fide agricultural, horticultural, timber, or marsh lands are to be assessed for property tax purposes on the basis of their use value. The use value of agriculture, horticulture, or timber land is the highest value of the land when used for the sole purpose of continuing operations as a commercial agricultural, horticultural, or timber enterprise. Use value of marsh land is the highest value of the land for the sole purpose of continuing the traditional use of marsh lands for hunting, fishing, trapping, or various types of aquaculture by a prudent manager of marsh lands. Use value is established without consideration of other criteria of value, particularly without reference to fair market value or value to the public in general.

Bona fide timberland is land stocked by forest trees of any size and species, or formerly having such tree cover within the last 3 years, that is not developed or being used for non-forest purposes, that is devoted to the production, in reasonable commercial quantities, of timber and timber products, and is under a contract with a State or Federal agency restricting its use for timber production.

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<sup>61</sup>This Act, also referred to as House Bill No. 1194, was passed during the 1976 legislative session.

To qualify for use value assessment, the land must contain at least 10 acres, or have produced an average gross annual income of at least \$2,000 in one or more of the designated classifications for the 4 preceding years. Furthermore, the landowner must sign an agreement that the land will be devoted to one or more of the designated uses.

When land which is valued and taxed under the provisions of this Act is converted to any other use, a rollback tax is levied that is equal to the difference between the tax on a use value assessment and the tax on a current fair market value assessment.

If land having a use value assessment is sold for a price greater than four times its use value the land is presumed to no longer be eligible for classification under the provisions of this Act. The burden of disproving this assumption lies with the landowner.

#### Determination of Use Value for Timberland<sup>62</sup>

##### Formula

Use value of bona fide timberland shall be determined by the following formula:

Value equals Net Income divided by Capitalization Rate.

In applying this formula the assessors shall utilize the use value table and the capitalization rate as determined by the Louisiana Tax Commission or its successor and said formula shall be applied uniformly throughout the State.

##### Net Income

To assist the assessors in the application of the formula described above and to determine the net income factor to be used in the formula, the Louisiana Tax Commission or its successor shall prepare and publish, a table defining the different classifications of timberland, the range of production within each class, and the range of production costs and gross returns based on four year averages. In preparing the use value table for timberland, the Tax Commission shall consider the following factors:

##### A. Classification of Timberland.

Class I: Timberland capable of producing more than 120 cubic feet of timber per acre per annum.

<sup>62</sup>This information is taken from Section 7 of H.B. No. 1194. The Louisiana Tax Commission is preparing further guidelines and use value tables for implementing this Act. However, the guidelines were unavailable at the time that this summary was prepared.

Class II: Timberland capable of producing more than 85 but less than 120 cubic feet of timber per acre per annum.

Class III: Timberland capable of producing less than 85 cubic feet of timber per acre per annum.

Class IV: Timberland capable of producing less than 85 cubic feet and which is subject to periodic overflow from natural or artificial water courses, and which is otherwise considered to be swampland, and which is located within the confines of the Atchafalaya Basin Floodway.

B. Range of Productivity.

Productivity of timberland shall be determined by reference to the USDA Forest Service Periodic Surveys and the USDA Soil Conservation Service Woodland Classifications.

C. Net Income.

Net income shall be determined by multiplying the annual cubic foot growth per acre for timber in each of the four classifications defined in 2(a) as determined by the USDA Forest Service Periodic Survey times the value per cubic foot of timber stumpage as derived from the severance tax returns and reported by the Louisiana Tax Commission or its successor, less the management cost. The gross return and the management cost shall be based upon weighted averages for timber produced in Louisiana for the four-year period immediately preceding the year in which the table is prepared, as determined from figures furnished by the Louisiana Tax Commission and the Office of Forestry, Louisiana Department of Natural Resources.

Capitalization Rate

In determining an appropriate capitalization rate to be used in the use value table, the Louisiana Tax Commission or its successor shall take into consideration the following factors:

- A. Physical and economic risk.
- B. Effect of relative marketability of timberlands on liquidity of said investments.
- C. Competition with other investments and prevailing interest rates.
- D. Any other factors which may be appropriate.

In no event shall the capitalization rate be less than 10 percent.

In determining the use value of lands classified as Class IV timberland, as defined in Section 2 above, the Louisiana Tax Commission or its successor shall use the net income figure employed in determining the use value of Class III timberland; but shall adjust the capitalization rate upward so as to appropriately reflect the low productivity of lands falling within classification IV as a result of overflow and silting conditions.

## MAINE

The Maine Tree Growth Tax Law<sup>63</sup> assesses forest land for property taxes on the basis of productivity value, rather than on fair market value. This law is mandatory in part; optional in part. Forest products, including logs, pulpwood<sup>64</sup>, woodchips, and lumber, are exempted from the personal property tax.

### Maine Tree Growth Tax Law<sup>65</sup>

#### Classification (Section 574)

1. Mandatory Classification--Any parcel of land greater than 500 forested acres is classified under the Maine Tree Growth Tax Law.

2. Optional Classification--Any parcels of land of 10 to 500 forested acres may be classified at the election of the owner.

3. Minimum Size--The law does not apply to parcels of less than 10 acres of forest land.

4. Common Interests--Unanimous consent of all co-owners of the parcel is required for filing.

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<sup>63</sup>Constitution of Maine, Article IX, Section 8  
36 MRSA, Sections 571 through 584.

<sup>64</sup>Op. cit., Section 655-C, Title 36, Chapter 105.

<sup>65</sup>Bureau of Taxation. 1976. Property tax bulletin No. 19.

Determination of Valuations (Section 576)

The State tax assessor determines the 100 percent valuation per acre for each forest type by county biennially. The 100 percent valuations are filed with the secretary of state and the Bureau of Taxation, and certified to municipal assessors on or before April 1, annually (table 14). Valuations may be appealed under Section 582.

Table 14.--Maine tree growth tax law 100 percent valuation per acre, by county and forest type, tax years 1977-78<sup>1</sup>

County	Softwood <sup>2</sup>	Mixed wood <sup>3</sup>	Hardwood <sup>4</sup>
- - - - - dollars - - - - -			
Androscoggin	59.00	36.10	12.60
Aroostook	38.70	28.20	12.50
Cumberland	40.30	24.40	9.40
Franklin	40.00	25.10	13.30
Hancock	30.50	19.40	7.80
(Balance of table omitted)			

<sup>1</sup>This table was developed by the State assessor's office, as required by Section 576. The procedures for determining these values are outlined in Maine Exhibit A. See page 78.

<sup>2</sup>"Softwood type" means forests in which pine, spruce, fir, hemlock, cedar, and larch, singly or in combination, comprise 75 percent or more of the stocking.

<sup>3</sup>"Mixed wood type" means forests in which neither hardwoods nor softwoods comprise 75 percent of the stand but are a combination of both.

<sup>4</sup>"Hardwood type" means forests in which maple, beech, birch, oak, elm, basswood, poplar, and ash, singly or in combination, comprise 75 percent or more of the stocking.

Assessment (Section 578)

1. Assessed Valuation--Municipal assessors adjust the State tax assessor's 100 percent valuation per acre for each forest type of their county by whatever ratio, or percentage of current just value, is then being applied to other property in the municipality to obtain the assessed valuation. The municipal assessor's valuation may be appealed under Section 583.

2. Tax Rate--Classified forest land shall be assessed at the same property tax rate applicable to other property in the municipality.

3. Reimbursement for Tax Loss--For any tax year in which the aggregate tax assessed on classified forest land is less than 90 percent of the aggregate tax assessed on the same lands in 1972, the State reimburses the municipality for the taxes lost to the extent that such loss exceeds a 10 percent loss from 1972, or 11 cents per acre for all classified forested land, whichever is greater.

#### Valuation of Areas Other Than Forest Land (Section 576-A)

Areas other than forest land within any parcel of forest land must be valued on the basis of fair market value.

#### Reduced Valuations (Section 577)

1. Reduced valuations may be obtained for classified forest land if, on January 1, 1972, the forest land did not contain more than 3 cords per acre of merchantable wood. The reduction in valuation is 50 percent for each tax year until April 1, 1983.

2. If fire, disease or other natural disasters reduce stocking to less than 3 cords per acre of merchantable wood on classified forest land, the valuation is to be reduced by 75 percent for the first 10 tax years following the loss.

#### Reclassification (Section 580)

Landowners are required to give the assessors notice of any change in forest type; if this requirement is not met, the assessors may nevertheless reclassify the parcel when the facts justify a change in forest type.

#### Provisions for Withdrawal of Classification and for Penalties (Section 581)

If classified land no longer is used primarily for the growth of trees and forest products, it may be withdrawn from classification by the assessor or at the request of the owner. Also, parcels of less than 10 acres resulting from sale are to be withdrawn from taxation under this law.

A penalty is applied as a result of the withdrawal, except when withdrawal is caused by a transfer resulting from the exercise or threatened exercise of the power of eminent domain. This penalty is equal to the greater of:

1. An amount equal to the taxes which would have been due had the land been assessed at its fair market value for the preceding 5 years or

the number of years since classification, whichever is the least, less all taxes paid over this time, plus interest at the legal rate, or:

2. An amount equal to the following percentage of the difference between the 100 percent valuation of the classified land on the assessment date immediately preceding withdrawal, and the fair market value of the property on the date of withdrawal:

10 percent - April 1, 1973 to March 31, 1978;  
20 percent - April 1, 1978 to March 31, 1983;  
30 percent - After March 31, 1983.

Fair market value is defined as the assessed value of comparable property in the municipality, adjusted by the municipality's certified assessment ratio.

#### Maine Exhibit A

##### Determination of the 100 Percent Per Acre Values by Forest Types by County

1. In each county a weighted average stumpage price is determined for each timber species for each of the four product groups (softwood pulp, softwood sawtimber, hardwood pulp, and hardwood sawtimber). In calculating the average stumpage prices (value of the uncut timber in the woods) for each species, the different prices are weighted by the volumes sold at that price as reported in Maine Forestry Department Confidential Report of Annual Timber Stumpage Sales.

2. The average stumpage prices for each species are then weighted by inventory volume, summed for each of the four product groups, and then divided by the total volume per group to determine the weighted average stumpage price for each product group for each county.

3. The average price of each product group in each county is converted into stumpage value per cubic foot on the basis of USDA Forest Service conversion factors.

4. The per cubic foot stumpage values for each of the four product groups in each county are then multiplied by gross average annual wood production rates, by product, for each of the three forest types (softwood, mixed wood, and hardwood).

5. The resulting increment values for each of the four product groups is then totaled by forest type and county and reduced by 20 percent to reflect the growth that can be extracted on a sustained basis, to determine the average annual net wood production rates.

6. This figure is then capitalized at 8.5 percent and rounded to the nearest \$.10 to arrive at 100 percent valuation per acre by forest type in each county.

## MARYLAND

Agricultural Use Assessment<sup>66</sup>

Woodland is entitled to an agricultural use assessment (present use assessment) where the subject property is (1) a part of a tract actively devoted to farm or other agricultural use, (2) a part of a commercial forestry operation, or (3) a scientific tree farm.

To qualify for agricultural use assessment under number 1 above, the landowner must supply evidence as to whether or not the woodland is part of a tract of land actively devoted to farming, or whether the woodland is separated from the tract of land actually devoted to farming, but was acquired at the same time. Under number 2, copies of supporting contracts, agreements, or a plan prepared by a registered forester are required evidence for qualification for this preferential assessment. Scientific tree farms (number 3) are managed under silvicultural principles prescribed in a plan prepared by a registered professional forester.

Frozen Assessments<sup>67</sup>

Woodlands under forest management agreements approved by the state Department of Natural Resources may be subject to frozen assessments. The landowner must agree to manage the property according to a forest management plan certified by the State forester. In turn, the State agrees that the assessed value of the land at the time of entry will not be increased. Also, the Maryland State Forest Service provides technical advice and assistance to the owner to meet the objectives of the plan.

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<sup>66</sup> Maryland Code, Article 81, Section 19(b).

<sup>67</sup> Op. cit., Article 81, Section 19(d).

MASSACHUSETTS<sup>68</sup>

Forest land, classified as such by the state forester, is subject to an annual bare land tax at current millage rates based upon the valuation of not more than \$10 per acre. A yield tax of 8 percent is imposed upon the stumpage value of all forest products cut, except for forest products harvested for the owner's or tenant's use up to a stumpage value (value of uncut timber in the woods) of \$100.

Forest lands are eligible for classification if they contain at least 10 contiguous acres and do not have a value above \$400 per acre. The landowner must submit a plan of forest management to the state forester for his review. If approved, the state forester issues a certificate of management; the local assessor then classifies the land as forest land.

MICHIGAN<sup>69</sup>Definitions

Cutover Land.--The land from which the original forest has been removed, partially or totally, and not used for agricultural, suburban, or urban purposes. Included is wild land, swamp land, and plains land. Uses vary from limited grazing in fringe farming areas, natural and planned reforestation, hunting and allied recreational activities, to no use whatever of certain barren and isolated areas. Power companies retain it for run-off and erosion control in developed watersheds and some of it is mere over-burden on known mineral deposits.

Forest Lands.--The same type land as cutover except that the commercial forest products on the land usually exceed the residual value of the land.

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<sup>68</sup> Chapter 61 as amended in 1969 by Chapter 873.

<sup>69</sup> Michigan State Tax Commission. 1972. Assessor's manual, Chapter III, pp. 1-9, 14-15, 17-22.

### Evaluation

The cutover area of Michigan is mainly in the upper half of the lower peninsula and in the upper peninsula. The value of this property varies from one area of the State to another.

Cutover land may have value deriving from considerations other than forest reproduction. The subjects of land value and forest product value will be discussed separately. However, because the natural cover is usually a direct indication of basic land capability and possible use, the cover must be considered at all times. The reproductive capability is an integral consideration in determining value.

Many factors are involved in establishing the value of any given parcel. Sales of cutover land in some areas may be limited. The appraiser must use all available market data to prepare a realistic appraisal. Once this analysis has been made, assessing becomes a matter of making objective and realistic comparisons. Values of forest/cutover land are assessed as follows:

1. Determine the type or class of land.
2. Determine the type and extent of cover.
3. Determine the present use.
4. Establish land values by comparison with similar properties of known value.
5. If timber products are present in commercial quantities, consider them separately; add appropriate values to the parcel.

The examples provided on the following pages are typical of thousands of parcels throughout the cutover area. In many instances trees and other plants will vary from the cover typical of the general soil types. These variations may result from severe burns, lack of seed trees, floods, etc.

### Principal Soil Groupings

The cutover lands include many of the 40 catalogued Michigan soil types which vary greatly in capability and thus in use and value. These soil classifications might be the foundation for scientific assessment of land, but for the cutover areas it would be impractical. Nevertheless, the basic soil cannot be ignored. It is the primary factor determining the capabilities of the land. Together with location and climate, the soil determines the use and value of the land. Soils of the cutover area fall into six, almost self-evident groups. These groups are easily recognized by their general characteristics:

1. Loams and sand loams
2. Sand loams and better sands
3. Heavy sand plains
4. Dry sand plains
5. Poorly drained organic soils
6. Nonproductive areas

These broad groups and their general features are summarized in table 15. This table is followed by more detailed descriptions of each group.

#### General Land Groups

The majority of the cutover area can be included in the six major land groups outlined in table 15. Most of it is either pine, hardwood, or swamp land. Figure 8 outlines the major land groups. However, each major area includes smaller areas of the other classes within its boundaries. Figure 9 shows four townships in the general hardwood land group of soils in Baraga County. While the greater part of the area is hardwood lands, there are within it smaller areas of pine and swamp land.

The cross hatched sections on figure 10 show some of the wooded areas of the State. The northern hardwood area follows quite closely the rolling to hilly loamy soils shown as hardwood land in figure 9. The swamp timber is, of course, found in the lowland area and the aspen, pine, oak and brush plains follow the outlines of the undulating to rolling plains area. These maps are of a very general nature. Exceptions will be found when you compare the maps with actual conditions, demonstrating the importance of examining every parcel of property to make a good appraisal.

#### Value

The market value of cutover land of every class varies from area to area because of the location and physical characteristics. The foregoing sections described and illustrated the classification of the cutover areas by similar, broad, general characteristics. The following information and examples show how to apply that information in arriving at a good appraisal. In general, the nonproductive class is the least valuable while the hardwood class is the most valuable. Local and physical factors vary, so many exceptions exist.

Table 15.—Summary of major classes of forest land in Michigan

Soil	Topography	Cover	Location	Characteristics
L.OAMS SAND LOAMS	Rolling plains Broad ridge Tops Hills, slopes	ORIGINAL Hardwood Occasional white pine Hemlock	West part of U.P.* N. & W. Sec. of L.P.**	Usually a good stand of second growth started. Some of this land now in agriculture. Land generally of higher basic value than other classes. Luxuriant ground cover.
HARDWOOD LAND	PRES	Largely aspen Northern hardwood White spruce		
SANDY LOAMS BETTER SAND	Undulating to rolling;	ORIGINAL Some hardwood White pine Red pine Mixed pine and hardwood wood PRESENT Aspen White birch Scrub oak Soft maple	Large areas in central and east part of L.P. Scattered in U.P.	Much is covered with good grade aspen. Produces fast growing jack pine. Good site for red and white pine. Good wild pasture. Badly burned areas may be exceedingly poor.
HEAVY SAND PLAINS	Level to rolling;	ORIGINAL Largely Norway spruce Some white pine poor hardwoods PRESENT Largely scrub oak Slow growing jack pine	Chiefly in north central part of U.P. and north central part of L.P.	Produces fair jack pine, black oak, pin oak, coarse grasses and brush.
DRY SAND PLAINS	Level	ORIGINAL Poor Norway spruce Mixed brush Coarse grass PRESENT Scattered jack pine, scattered brush coarse mixed	Typical areas in Schoolcraft, Alger, Kalkaska and Roscommon Counties Large areas in northern half of L.P.**	Much of this badly burned and exceedingly poor.
POORLY DRAINED	Flat to undulating	ORIGINAL Tamarack, spruce, balsam, cedar, ash, elm, balm of Gilead species, and other swamp species. PRESENT Growing back to original species.	Nonproductive; Usually lowest value.	Nonproductive; Usually lowest value.
NON-PRODUCTIVE Sand dunes Rock Muskeg Marsh Land Boulder strewn	Var [ab]o	Practically none	Scattered	Little value. Generally very low value. Occasional scenic or building site value.

\*Upper peninsula  
\*\*Lower peninsula



Figure 8.--Map of general land groups in Michigan

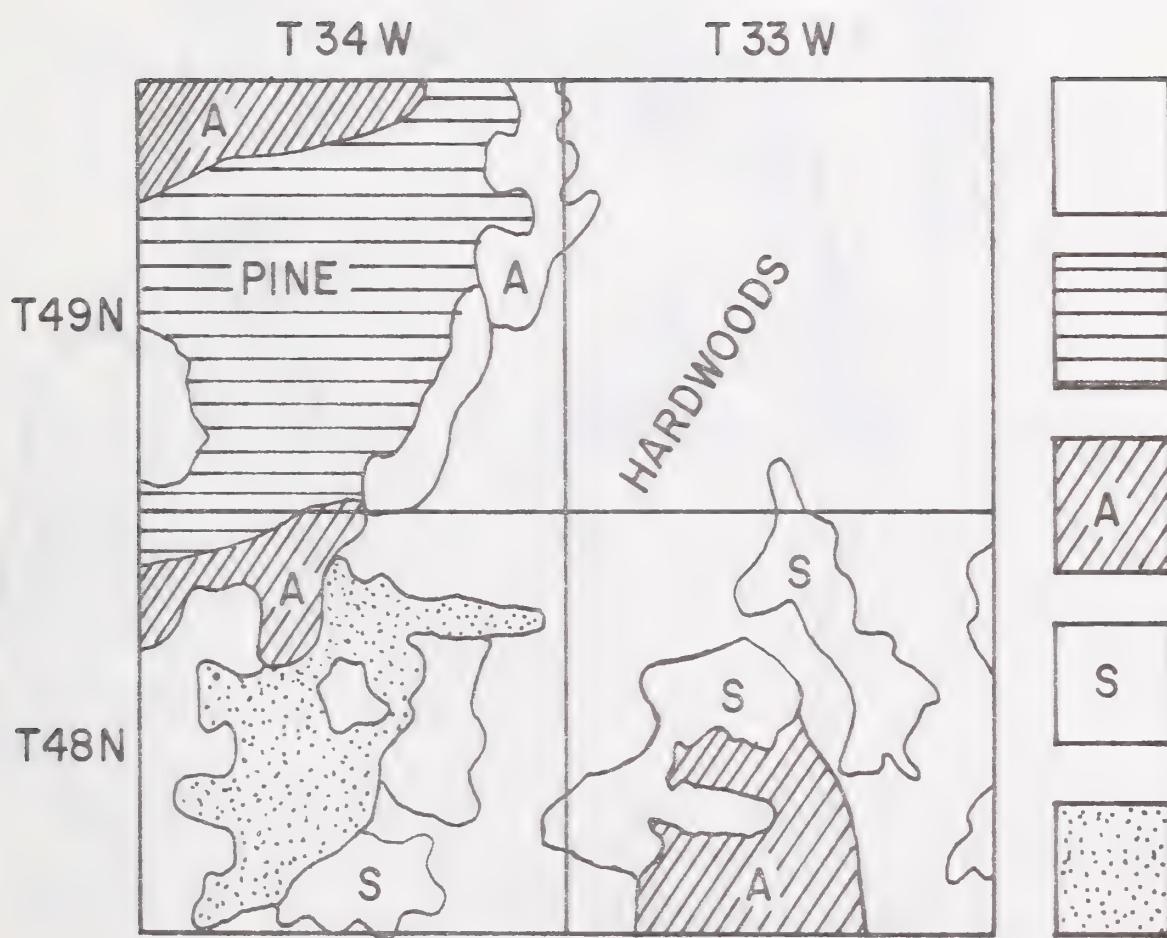


Figure 9.--Map of four townships in Baraga County, Michigan



Figure 10.--Forest cover types in Michigan

### Location and Physical Characteristics

A partial list of local and physical conditions that affect value includes:

#### A. Location

1. Location or accessibility	2. Demand or salability
No road	Close to town--building
Trail road	Sites close to farms--pasture
Improved dirt road	Hunting area
Gravel or paved road	Resort area
Availability of electricity	Tree farms
Proximity of telephone	

#### B. Physical

1. Topography	3. Water
Level	Lakes and streams
Rolling	Cost of wells
Hilly	
Erosion	4. Forest products
Drainage, good to poor	Seedlings, saplings, poles, pulp, logs
2. Soil--productivity	Christmas trees
	Miscellaneous other products

### Specific Price Information

Acreage values for the forest/cutover classes in the Upper Peninsula, as determined from a 1971-72 sales study, range from \$30 to \$50 per acre, with an average value of \$35 per acre. These sales would include any value attributable to timber. Many sales are 40-acre tracts from which the merchantable timber has been removed. Where the timber has been "select cut," a good stand of second growth may remain. However, if the timber has been clear cut, probably only sapling growth is left. Or, the area may be cleared of any cover for re-seeding, which would promote uniform reproduction of desirable species.

Lands adjoining or containing a stream or river have an added value to consider. Streams up to 10 feet in width add \$100 to \$500 of value to a 40-acre tract, depending on the quality of the stream. Streams 10 feet and over in width are priced on a front foot rate. Front foot values should be estimated from comparable sales in the area.

The assessor must determine the value of the various types of cut-over land in the area. Once the true cash value of specific parcels has been determined in the assessment district, that information and the examples assembled in this manual are used to estimate an appraised valuation.

Examples of Appraisals<sup>70</sup>

Figures 11 to 14 illustrate methods of arriving at the market value of parcels that fit descriptions discussed earlier.

Rolling to hilly lands

See appraisal illustrations in figures 11 through 14.

Location.--Considerable areas throughout most of the Lower Peninsula and the west end of the Upper Peninsula. Typical large areas in Iron, Dickinson, Menominee, Antrim, Otsego and Osceola Counties. Many small areas in other counties.

Soil.--Varies from clay to sandy loam. Usually well drained.

Topography.--Rolling to hilly. Areas of slopes exceeds that of flat land.

Cover.--Typical species are sugar maple, yellow birch, beech, basswood, white ash, elm, aspen, white birch, hemlock and white pine, frequently intermixed. Broad leaf species ranging from aspen to maple are the usual natural cover. Much of the open area has been planted to pine.

Utilization.--When suitably located, some rolling to hilly land has been developed for farming. Hilly and isolated areas not cleared are developing natural reproduction or are being reforested by the owners.

Many small lakes and streams, together with a variety of natural cover on this type of land, in the wild state, produce and support game animals and birds. This land serves the demand for hunting and other recreational land.

Level to rolling land

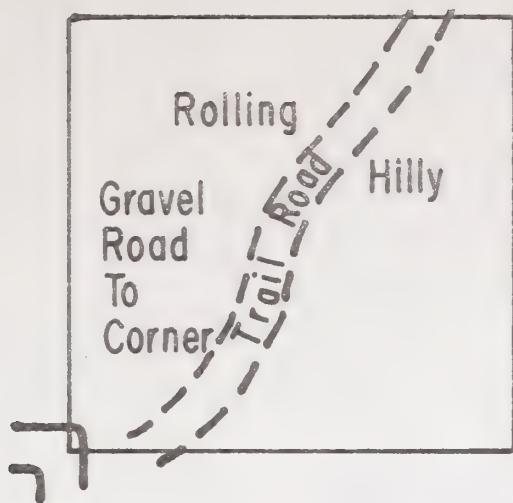
See appraisal illustration in figures 15 and 16.

Location.--Typical of much of the Huron and Marquette National Forest lands. Large areas in Crawford, Kalkaska, Marquette and other counties.

Soil.--Light, non-productive sand and sand subsoil. Droughty.

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<sup>70</sup>Twenty-four illustrations of cutover land are provided in Michigan's Assessor's Manual. Only eight are included here. Also, all appraisal examples in the Manual are accompanied by photographs that show the various combinations of land groups and cover types. However, these photographs have not been reproduced in this summary.



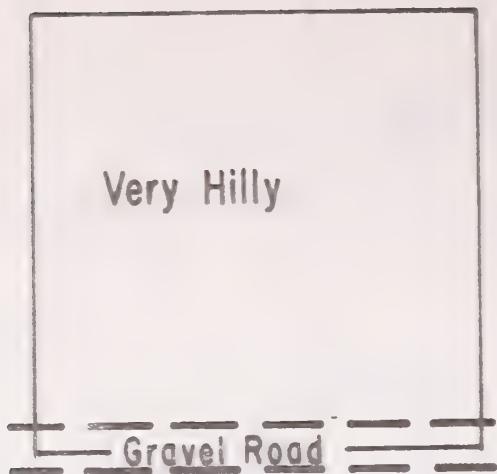
Section 1 SW 1/4 of SW 1/4 Rolling to hilly Sandy loam Mixed hardwoods, 0 to 6 inches in diameter	Average prevailing value for this area: \$100 per acre  Add for good stand, second growth: \$10 per acre	
	40 acres at \$100	\$4,000
	Good second growth	400
	Gravel road	200
		<hr/>
		\$4,600
Original forest hardwood		

Figure 11.--Example of valuation for sand loam site on rolling to hilly lands in Michigan

Section 22 NW 1/4 of NW 1/4 Rolling hill crest Medium loam Mixed hardwood 0 to 6 inches Some 6- to 9-inch maple Scattered basswood	Average prevailing value for this area: \$110 per acre  Excellent stand, second growth Approx. 500 cord cordwood	
	40 acres at \$110	\$4,400
	500 cords of wood at \$2*	1,000
	Improved dirt road	150
		<hr/>
Original forest Mixed hardwood		\$5,550

Figure 12.--Example of valuation for medium loam site on rolling to hilly lands in Michigan

\*Forest product values shown are at 1972 stumpage rates. Land values are those typical of the Lower Peninsula above Town Line 16.



Section 4 SW 1/4 of SW 1/4	Average prevailing value for this area: \$125 per acre
Very hilly	
Heavy loam	40 acres at \$125 \$5,000
Original stand of mixed hardwood.	200,000 board feet of maple, \$35* 7,000
If cut, would leave excellent stand of second growth	100,000 board feet of beech, \$20* 2,000
	35,000 board feet of hemlock, \$10* 350
	Gravel road 200
	Fenced 200
	<hr/>
	\$14,750

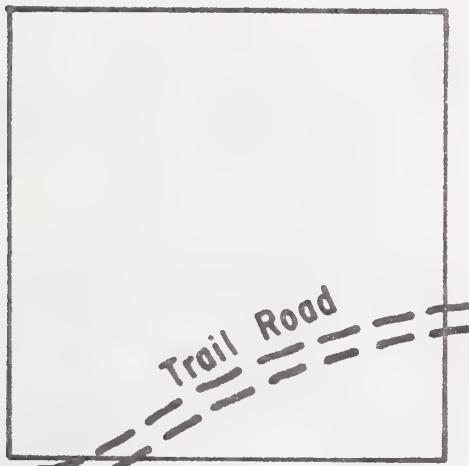
Figure 13.--Example of valuation for heavy loam site on rolling to hilly lands in Michigan

Section 12 NW 1/4 of NW 1/4	Average prevailing value for this area: \$100 per acre
Level to hilly	
Heavy sand	Land cleared and worked for short period, then abandoned.
Grass and moss	
Scattered trees	15 acres good tree farm area
Original forest	15 acres at \$100 \$1,500
Hardwood	25 acres at \$80 2,000
	Gravel road 200
	<hr/>
	\$3,700

Figure 14.--Example of valuation for heavy sand site on rolling to hilly lands in Michigan

Section 23	Average value for area: \$75 per acre
SW 1/4	
Level	1/2 mile from road
Light sand	Wild land. Not used
Sparse grass and brush	
Original cover: Norway spruce, scattered cherry poplar	160 acres at \$75 per acre \$12,000

Figure 15.--Example of valuation for light sand site on level land in Michigan.



Section 23	Average value for area: \$75 per acre
SW1/4	
Hilly	Adjoins trail road
Light sand	Enclosed. One wire on trees
Sparse sweet fern	Used for hunting
Original cover: White pine, scattered jack pine, 0 to 3 inches in diameter	160 acres at \$75 per acre \$12,000 Trail road 100 320 rods wire @ \$.50 160
	\$12,260

Figure 16.--Example of valuation for light sand site on hilly land in Michigan.

Topography.--Generally level to gently rolling. Fairly hilly in some areas.

Cover.--Scattered brush. Coarse grasses. Sometimes blueberries, pin cherries, etc. Produces jack pine of slow growth and poor form or scattered scrub oak. May be fire cherry and off-site aspen.

Utilization.--Generally not profitable for reforestation except for jack and perhaps Scotch pine.

Recreational use.--Confined to hunting, but because of poor ground and other cover produces little game food.

Agricultural use.--None.

Severely burned Norway spruce land usually reverts to this category of valuation. Very badly burned white pine land sometimes reverts to this category of valuation because of damage to the top soil.

#### Swamp and nonproductive land

No attempt will be made to provide any examples of appraisals of swamp lands. Samples would not represent enough general area in the State to be of any value because of the variability of this type. Swamp land generally has very little value as such. If it is the type of swamp that will reproduce timber the value of the product may be high. Well drained lowlands in some areas may be stocked with aspen or white spruce that will cut out at 20 cords of pulp per acre.

Based on a stumpage value (value of the uncut timber in the woods) of \$2 per cord, an acre of this type of swamp land could be worth \$40 for the timber products alone. Also, the land will have a certain value because it will reproduce timber. However, if a similar parcel was stocked with second growth timber that would not be merchantable for 10 to 15 years, it obviously would be worth much less. Assuming that such land had no value except for reforestation, and the owner was willing to accept only a 6 percent return on the investment, the maximum capitalized value would not exceed \$22.34.

The other extreme is the tamarack and tag alder swamps. Usually poorly drained, frequently inaccessible and producing very little game food, they would have a lesser value.

#### Forest Land

This section will be of value to the assessor and appraiser in estimating the amount of forest products under various conditions when more accurate cruises are not available. Forest lands are appraised by the same method as is used for cutover land. The value of the forest products is added to the basic value of the land. In the Upper Peninsula the basic land will vary in value from \$8 to \$30 per acre, depend-

ing on the productivity of the soil: \$8 on the poorer, sandy soils, to \$30 on the more productive clays and better sand loams. This, of course, assumes no other utilization possibilities other than tree growth. The most important step is the determination of the amount of merchantable forest products on the land. Timber cruiser's reports or aerial photo interpretations should be used to determine the amount of merchantable forest products. If no cruise reports are available, then volume tables may be used to estimate the board feet of logs or the cords of pulp per acre such as those given in table 16. The stumpage prices for the most common forest products are given in table 17.

The essential information needed and the sources are:

Basic soil value.--See cutover section.

Amount of merchantable forest products.--Timber cruise reports and volume tables 16 and 17.

Stumpage value of forest products.--See "Note" in table 18. See computations, table 18.

When it is necessary to use volume tables, use the following procedure:

First.--Determine the diameter range of the trees, seedlings, saplings, pole timber, etc. The diameter range should be for the majority of the trees present.

Second.--Determine the volume range. The trees may run heavy to the large size and the high volume range used, or, if the stand runs heavy to the smaller size, the low volume range should be used. This is to select the proper volume range.

Third.--Determine the stocking class of the land. The tables are based on the percent of growing space effectively used by trees with 10 to 39 percent rated as poor, 40 to 69 percent rated as medium, and over 69 percent rated as good stocking.

These calculations will give the board feet per acre or the cords of pulpwood per acre, depending on the species. Interpolation can also be done if necessary.

#### Addition of Forest Product Value

Forest products of commercial size and quality, growing on forest or cutover land, must be evaluated together with the basic land value when assessing forest property.

Table 16.--Volume per acre by stand size and stocking class<sup>1</sup>

Size class	Diameter range	Volume range	Stocking			Stocking		
			Bd. ft.	Cords	Bd. ft.	Cords	Bd. ft.	Cords
Seedlings	Inches	0-1	0	0	0	0	0	0
Saplings	1-5	Low	0	0	0	0	0	0
	Average	0	2.5	0	2.2	0	0	1.5
	High	0	2.9	0	2.8	0	0	2.0
Pole timber	5-9	Low	700	13.0	500	7.0	200	3.0
	Average	1,400	20.0	1,000	12.1	990	5.2	
	High	1,500	24.0	1,500	12.9	1,200	7.0	
Small saw timber	9-15	Low	6,000	18.0	3,000	13.0	1,500	5.0
	Average	7,700	22.9	4,950	17.6	2,800	10.9	
	High	10,000	26.0	6,000	20.0	3,000	13.0	
Large saw timber	15-	Low	10,000	24.0	5,000	17.0	1,500	6.0
	Average	14,850	33.5	8,100	21.2	4,140	12.1	
	High	18,000	40.0	10,000	26.0	5,000	16.0	

<sup>1</sup>Table compiled by Paul C. Guilkey, Research Forester, USDA Forest Service.

Table 17.--1972 stumpage prices per thousand board feet cruised<sup>1</sup>

Mixed hardwoods:		Swamp hardwoods:	
Hard maple, oak, birch, basswood	\$25-50	Elm, ash, soft maple	\$20-30
Yellow birch	\$50-125	White and red pine	\$20-30
Basswood	\$30-50	Jack pine	\$15-20
Hard maple	\$32-65	Hemlock	\$ 9-13
Beech	\$ 7-15	Elm	\$18-23
Red and white oak	\$30-45		
Tie cuts		Chemical wood	
Red and white oak, hard maple	\$.50-1.00 each	\$1.25 to \$1.87 per ton or \$.50 to \$.75 per cord	
Soft maple	\$.40-.80 each		
Other softwoods	\$.40-.60 each		
Pulpwood per 4' x 4' x 100" cord			
Aspen	\$1.75-3.50	Balsam fir	\$4.00-6.00
Hemlock	\$4.00-6.00	Pine	\$4.00-6.00
White birch, oak and hard maple	\$2.00-4.00	Spruce	\$5.00-7.50
Mixed hardwoods	\$ .75-1.00		
Box bolts per 4' x 8" x 55" cord			
Aspen	\$2.50-3.50	White birch	\$2.00-5.00
Basswood	\$6.00-8.00	Jack pine	\$3.00-6.00
Cedar posts			
7-foot post	\$.08 each	7- and 8-foot cedar post	\$3.50 per cord
10-foot post	\$.10 each	(Note: 4' x 8' x 8' is considered 2 cords)	
Poles Prices per lineal foot		Piling Prices per lineal foot	
Cedar	\$.06 per foot, up to 30 feet	Pine	\$.10-.15 per foot, up to 30 feet
Cedar	\$.08 per foot, if over 30 feet	Pine	\$.15-20 per foot, over 30 feet
Pine	\$.07 per foot, up to 30 feet	Hardwood	\$.15 per foot, up to 35 feet

<sup>1</sup>These prices may vary in different areas. They may be adjusted to fit the area and other unusual conditions which decrease or increase the cost of logging, or quality of timber. Average cost of logging as of 1972: Aspen \$13 to \$15 per cord, spruce and balsam fir \$20 to \$22 per cord, and saw timber \$35 to \$40 per 1,000 board feet.

Table 18.--Per acre values with various stumpage prices and board feet<sup>1</sup>

Board feet per acre	Stumpage price per 1,000 board feet					
	\$10	\$15	\$20	\$25	\$30	\$35
500	\$ 5	\$ 7.50	\$ 10	\$ 12.50	\$ 15	\$ 17.50
1,000	10	15.00	20	25.00	30	35.00
1,500	15	22.50	30	37.50	45	52.50
2,000	20	30.00	40	50.00	60	70.00
2,500	25	37.50	50	62.50	75	87.50
3,000	30	45.00	60	75.00	90	105.00
3,500	35	52.50	70	87.50	105	122.50
4,000	40	60.00	80	100.00	120	140.00
4,500	45	67.50	90	112.50	135	157.50
5,000	50	75.00	100	125.00	150	175.00
5,500	55	82.50	110	137.50	165	192.50
6,000	60	90.00	120	150.00	180	210.00
6,500	65	97.50	130	162.50	195	227.50
7,000	70	105.00	140	175.00	210	245.00
7,500	75	112.50	150	187.50	225	262.50
8,000	80	120.00	160	200.00	240	280.00
8,500	85	127.50	170	212.50	255	297.50
9,000	90	135.00	180	255.00	270	315.00

<sup>1</sup>A basic land value addition is required.

Forest products include:

Fence posts	Pulp wood
Poles	Chemical wood
Railroad ties	Cabin logs
Mine props	Saw logs
Excelsior wood	Veneer logs
Fire place and stove wood (usually by-products)	

The stumpage value varies from year to year. It also varies from one area of the State to another depending on availability of markets, use of materials, etc. Current area stumpage values also vary between localities within the area. These variations are usually attributable to distance from market, type of transportation available and labor costs.

Production cost is the major factor to be considered by the assessor when using stumpage prices to determine the value of forest products. Production or logging costs include:

Accessibility of the tract to roads	Density of growth
Terrain or topography	Uniformity of size
Amount of underbrush	Uniformity of species
Drainage or quality of the soil	Availability of right-of-way to the tract
Quality of the timber	

Considerable quantities of commercial size timber have existed in areas where the cost of harvesting the product would have exceeded the F.O.B. price and so has not been cut. Such timber has no value, for the present.

Obviously, a uniform stand of pulp size aspen of good quality that might produce 20 cords per acre can be harvested more cheaply, and thus be worth more than if it would produce only 4 cords per acre. Likewise, any timber stand is worth more on a fairly level area where trucks can be driven to the product than a stand on hilly, rocky terrain where the product has to be skidded by tractor or team to a loading site. Furthermore, the value of aspen pulp from a mixed timber stand is usually less than pulpwood from a compact stand, due chiefly to the extra cost of collecting the product from scattered locations.

Note that most of the variables are cost factors that must be deducted from the going price when determining the value of the timber "in place". Similar factors must be considered when determining the value of every other forest product. Assessors in districts where this type of property is found should be familiar with these factors.

Commercial Forest Act<sup>71</sup>

Owners of qualifying forest land may apply to have their land classified as commercial forest under the provisions of this Act. Such lands are taxed 15 cents per acre in lieu of the general property tax. A yield tax is levied on forest products cut. To qualify for classification as commercial forest the following requirements must be met: The land contains no material natural resources other than forest growth; no portion of the land is used for agricultural, mineral, grazing, industrial, recreational or resort purposes. The owner proposes to develop and maintain a forest either through planting or natural reproduction or both. Such land must be capable of producing a thrifty forest growth, and must carry sufficient forest growth of suitable character and so distributed as to assure that a stand of merchantable timber will be developed within a reasonable time.

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<sup>71</sup>Act No. 94, Public Acts of 1925, as amended through 1970.

## Timber Appraisal Illustrations

40 acres of hardwood land. Timber is easily accessible. Partly on lighter sand loam.

	<u>Board feet</u>
10 acres mixed hardwood at 1,500 board feet	15,000
per acre =	
30 acres mixed hardwood at 5,000 board feet	<u>150,000</u>
	Total
	165,000
Land: 10 acres at \$10* =	\$100
30 acres at \$20 =	<u>600</u>
	Land
	\$700
165,000 board feet at \$20 per thousand	3,300
Total land and timber	<u>\$4,000</u>

40 acres of level, sandy land. The productivity of land is poor. When cut, reproduction will be poor. Stand is old and at its maximum stocking now. Large number of trees per acre, but are short.

Pulpwood on this tract will average 5 cords per acre.

40 acres x 5 cord = 200 cords	
200 cords at \$4 =	\$800
Land: 40 acres at \$8 =	<u>320</u>
Total value land and pulp	\$1,120

40 acres of uniform hemlock. Land is rough. Difficult terrain to log. Stumpage price adjusted to compensate for rugged terrain. Timber runs about 5,000 board feet per acre.

40 acres at 5,000 board feet per acre = 200,000 board feet  
Stumpage price adjusted for abnormal conditions - \$8 per thousand

Timber value	\$1,600
40 acres at \$8 per acre =	<u>320</u>
Total land and timber	\$1,920

40 acres of loam (30-50 percent silt & clay). Good growth of aspen. Good stocking of tall trees. Readily accessible and close to market. Good roads.

40 acres at 26 cords per acre = 1,040 cords	
Price adjustment for location and quality: \$4 per cord	
Pulp value	\$4,160
40 acres at \$20 per acre =	<u>800</u>
Total land and products	\$4,960

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\*Land values are from Upper Peninsula studies

## MINNESOTA

Privately owned forest lands containing at least 5 acres suitable for planting, culture, and growth of continuous forest products may be classified under the optional Tree Growth Tax Law.<sup>72</sup> Classified lands must be used exclusively for growing forest crops in accordance with sustained yield practices. Classified forest lands are taxed on the basis of the annual increase in value in accordance with the following provisions:

1. Lands growing commercial forest types are taxed each year at the rate of 30 percent of the value of the average annual growth of the timber.

2. Temporarily nonproductive forest types are taxed 5 cents per acre per year, providing the owner complies with the agreement for reforestation within the time specified in the agreement. In the event of noncompliance, the land is taxed at 15 cents per acre per year.

3. Permanently non-productive lands are taxed at 5 cents per acre per year.

4. For each acre of land planted and maintained with at least 500 trees of a commercial species, the owner may be allowed a credit of 50 cents per acre per year against taxes on other lands within the same governmental subdivision. The credit cannot exceed the amount of the tax due upon the land. When the plantation is 10 years old it becomes classified and taxed as a commercial forest type.

#### Definitions

Commercial forest type.--Any forest type which has 3 cords or more of standard pulpwood or saw logs per acre, or 500 stems or more of commercial tree species per acre.

Temporarily non-productive type.--Land capable of producing a commercial forest type, but not doing so at the present time.

Value of the annual growth.--The average annual growth rate per acre for a type, multiplied by the weighted average of the stumpage values (value of uncut timber in the woods) of all species in the type. The most recent official forest survey report must be used to determine the proportions of the various species to be used in computing the weighted average of the stumpage values.

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<sup>72</sup>Statute sections 270.31-39 (1964).

Average Annual Growth Rates

The rates are established with due regard for the studies of average annual growth rates made by the Division of Forestry for the State of Minnesota and the USDA North Central Forest Experiment Station. The rates are reviewed and re-established every 10 years by the county board.

Stumpage Value<sup>73</sup>

The stumpage value for each species to be used in computing the tax in any county is computed during each even-numbered year; it is the average price received by the State upon all of sales of sound standing timber of the species during the previous 2 years. When there have been no sales of the species within the county within the previous 2 calendar years, the Commissioner of Natural Resources sets a stumpage price for the species for the use of county boards.

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<sup>73</sup>Correspondence with the Commissioner of Revenue, October 6, 1978.



## MISSISSIPPI<sup>74</sup>

Local assessors are responsible for appraising forest lands for annual ad valorem taxes. Standing timber itself is exempt from the annual property tax, but is subject to a severance tax at the time of harvest.

Several tools are necessary for apprising rural lands, including forest lands. Among these are maps and aerial photographs.<sup>75</sup> Maps should be used to record ownership lines, details on legal descriptions and zoning, terrain features, and soil types. Aerial photographs can be used to calculate acreages, determine land uses, establish timber types and densities, etc. Some inaccessible areas may have to be appraised solely on the basis of aerial photographs.

### Appraisal Process

Soils suited primarily for forest products are classified according to their potential for producing wood crops under prescribed lands of operation. The method used by foresters in rating this soil quality is known as "site index," which means the average height of the dominant trees in a stand at an age of 50 years, except 30 years for cottonwood and black willow, and 35 years for sycamore.

A complicated system of classification would be too time-consuming and beyond the capability of available personnel. Instead, assessors should break down forest soils for each of the legally prescribed classifications into not more than three broad groups (e.g., Good, Medium, and Poor). One group will probably suffice for Cypress. For pine land, a breakdown into flatwoods and upland soils may be sufficient. The advice of the county forester and soil conservationist will be of great value.

Establish an average per acre value for each soil classification for the entire county. If there is a noted difference in the market value of two or more tracts of woodland because of varying distances from the market, the assessor may break land value units at a township or range line, river, or main highway. However, exact points of demarcation are extremely difficult to establish and, if at all possible, should be avoided.

<sup>74</sup>Mississippi Tax Commission. 1976. Mississippi appraisal manual for assessors, Volume II: The appraisal process and appraisal of land. pp. 129-138 and 143-145.

<sup>75</sup> See pages 130-134 of the above manual for more instructions on various maps, surveys, and aerial photographs.



In appraising forest land, the condition of roads is not as important as in the case of land producing perishable crops, such as vegetables or milk. However, the assessor may want to recognize the difference by some small reduction or addition in per acre value, as reflected by the market. There will be areas where natural physical obstacles make harvesting difficult, such as a pine island surrounded by cypress swamp. Such areas are entitled to reductions in value.

Assembling and analyzing sales data is a basic and crucial step in estimating the true value of forest land. Even though there are fewer sales in this category than in farm land, a thorough search will usually unearth sufficient sales data for use in forming value opinions.

The production and market value of pine pulpwood is more stable than that of annual crops, and the income approach may serve as a basis for comparison between various classifications. The following example illustrates this method. It is purely hypothetical and should not be construed as a guide to absolute land values.

Assume that the average stumpage price of pine cordwood in a particular locality is \$6, that the rate of growth is 1 cord per year, and that investors expect a rate of return of 7 percent on pine land.

1 cord at \$6	\$6.00
Less management (taxes, labor, etc.)	1.00
	<hr/>
	\$5.00

Estimated per acre value of pine land (\$5.00 ÷ 7 percent)	\$71.40
Rounded to	\$70.00

If available sales data indicate an actual cash value per acre of \$80 for Class "B", but no sales data are available for Class "A", and an income analysis shows "A" to be 25 percent better, the assessor then has a basis to substantiate a value of \$100 for Class "A".

The greatest handicap in using the income approach as a firm basis for assessments is the difficulty in establishing a fair interest rate.<sup>76</sup> One assessor might use 7 percent while an assessor in an adjoining county might feel that fire and insect hazards warranted a rate of 9 percent. If the annual net income were estimated at \$5, the first assessor would derive an estimated per acre value of \$71.40, while the second would arrive at a value of only \$55.60.

Tax assessors are advised to be alert to changes in motives of rural land purchasers, such as buying land for use as game preserves or other recreational facilities; purchase for future residential,

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<sup>76</sup>The development and use of capitalization rates are discussed on pp. 145 and 154-160 of the Appraisal Manual.

commercial, or industrial developments; the purchase of rural lands for tax shelters; and as sites for country homes of professional and business people. The assessor should make proper sales analyses and place correct values on rural lands.

## MISSOURI

Forest properties are not specifically treated in the general instructions of the State Assessor's Manual. However, guidelines are provided in these instructions for assessing agricultural lands, which include forest lands, under Senate Bill 203. If a forest landowner applies to have land assessed under the provisions of this law the county assessor must assess the land according to the stipulated guidelines on the basis of its value in current use. Although assessors are not bound by the recent law, these instructions may serve as a guide for assessing other forest lands as well.<sup>77</sup>

### Assessment Procedures

The assessment procedure<sup>78</sup> recommended enables the assessor to cover the maximum amount of ground with a given budget. It is realized that neither time nor money are available to the assessor to spend 10 to 12 hours on each property that must be appraised. On the other hand, if fair and equitable real estate assessments are to be maintained, more effort is required than a mere "windshield appraisal." Each phase of this assessment procedure has been designed to minimize the time required in each step. The key is the establishment of a real estate record card file with information about each property and a record of how the assessed values were determined.

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<sup>77</sup> Missouri State Forester. 1977. Personal correspondence. Missouri Department of Conservation.

<sup>78</sup> Missouri Tax Commission. Assessor's manual. (n.d.) Jefferson City, MO. pp. 31-36

### Classification

For land to be eligible for valuation and assessment for general property taxation under Senate Bill No. 203, it must meet the following qualifications:

1. The owner must apply to the assessor for valuation under the provisions of this law.
2. The land must be actively devoted to agricultural use<sup>79</sup> and it must have been so devoted for at least 5 years immediately preceding the year of application.

Land is considered to be devoted to agricultural use if it is used in the production for sale of plants and animals, including but not limited to forages; grains and feed crops; dairy animals and dairy products; poultry and poultry products; beef cattle, sheep, swine and horses; bees and apiary products; trees and forest products.

Land is deemed to be actively devoted to agricultural use when the gross sales of the agricultural products produced on the land have averaged at least \$2,500 per year during the 5-year pre-application period, or there is clear evidence of anticipated yearly gross sales amounting to at least \$2,500.

### Factors to Consider in the Valuation of Agricultural Land

In valuing land which is qualified as land actively devoted to agricultural use, the assessor only considers those indicia of value which the land has for agricultural use. In addition to personal knowledge, judgment, and experience as to the value of land, the assessor may consider agricultural capability based on soil survey data; economic factors; parity ratios from research provided by the College of Agriculture, University of Missouri; and the recommendations of the State Tax Commission.

### Range of Values

The State Tax Commission annually determines and publishes a range of values for each of the several classifications of land in agricultural use in various areas of the State. Its primary objective is to determine the ranges in fair value on the basis of productive capabilities when devoted to agricultural uses. The Commission may consider, among other information, available, evidence of agricultural capability based on a soil survey by the College of Agriculture of the University

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<sup>79</sup>Horticultural lands may also be eligible for assessment according to the provisions of Senate Bill No. 203. However, the assessment of these lands is not treated here.

of Missouri and the National Cooperative Soil Survey. On or before January 1 of each year, the Commission makes these ranges of fair value available to the assessors in each county. Such ranges of value may reflect a reasonable capitalized value of 7 percent per acre.

In compliance with Section 137.026, the Commission has prepared a verbal description of seven grades of soil to be used by the taxpayer and the assessor in categorizing the total acreage under application:

<u>Grade</u>	<u>Assessed value per acre (\$)</u>
1	116
2	110
3	87
4	58
5	29
6	14
7	10

\$116--Grade #1. This is prime agricultural land--the best soils of Missouri with no limitations that restrict their use for agriculture. They would return maximum output with minimum input.

\$110--Grade #2. Soils in this class have few limitations and are suited to a wide range of crops. This grade would be primarily bottom-land not subject to much overflow.

\$ 87--Grade #3. Soils in this class have some limitations. These would be primarily the best upland soils of high productivity with gentle slopes that may require some crop rotations or conservation practices.

\$ 58--Grade #4. Soils in this class have severe limitations that reduce their value for crop use. They must employ crop rotations and other conservation practices. These limitations would be (1) moderately steep slopes, (2) an underlying hardpan, and (3) soils subject to frequent overflow.

\$ 29--Grade #5. These soils have severe limitations such as low fertility, steep slopes, shallow soil, wet soil, and some stone. They are suited for cultivated crops only to a limited extent. They require maximum conservation practices.

\$ 14--Grade #6. These soils are useful primarily as pasture. There could be some hay land in these soils. They are unsuited for cultivation. Limitations would include steep slopes, erosion, shallow soils, stones and wet soils.

\$ 10--Grade #7. Farm acreage that has little or no agricultural value.

### Forest Croplands

Special provisions under Section 254.160 of the Missouri Revised Statutes allow lands which have been classified as forest croplands to be assessed for general taxation purposes at \$3 per acre and taxed at local rates. The timber on these lands is subject to a yield of 6 percent of value at the time of harvest.

### MONTANA

Under legislation adopted in 1973,<sup>80</sup> the State Department of Revenue<sup>81</sup> provided a "general and uniform" method of classifying lands for assessment. Timberlands are specifically included in this requirement. Timberland classifications are divided into four phases:

- I. Area determination
- II. Timber stand volume table preparation
- III. Valuation table preparation
- IV. Tax assessment.

Phases I and II are accomplished by the State Forest Service. Timber stand volume tables are prepared by using data from USDA's Forest Service, State Forest Service, and private timber industry. An Operational Manual<sup>82</sup> outlines the general plan for forest land and timber assessments. It covers field checking procedures, preparation of base maps, and area calculation, with specific reference to area determination and classification. Land use, forest type, stand size, stocking, and access and topography classes are defined. The access and topography classification is shown in table 19.

Valuation was covered under Phase III. Excerpts taken from a 1963 report of the State Forester's Evaluation Committee, "Proposed Valuation of the Reclassified Private Forest Lands," follow. The system developed in the report has since been adopted by the Department of Revenue.

<sup>80</sup>Revised Statutes Section 84-429.12.

<sup>81</sup>Successor to Board of Equalization.

<sup>82</sup>Operational Manual for Inventory of Private Forest Land--Phase I, Area Determination. 1958. 40 pp.

Table 19.--Access and topography classification

Access and topography	Road development characteristic to tract	Topography on tract	Distance from manufacturing point <sup>1</sup>	Total grade in class <sup>2</sup>
Favorable	Grade R-1. Tract within 1 mile of usable road. Easy road construction. No rock outcrops or swamp barriers.	Grade T-1. Flat to gentle, slopes generally under 40%. No rock outcrops or swamps. Good tractor logging ground.	Grade D-1. Less than 25 miles	3 and 4
Average	Grade R-2. Tract 1 to 3 miles from usable road. No difficult road problems. Average construction.	Grade T-2. Variable slopes under 60%. Some rock outcrop or swampy ground. Average logging conditions.	Grade D-2. 25 to 50 miles	5, 6, and 7
Difficult	Grade R-3. Tract 3 to 6 miles from usable road. Also includes tracts closer, but with difficult construction problems such as rock or water barriers and rough terrain.	Grade T-3. Rough, broken ground. Steep slopes. Numerous rock outcrops and bluffs or other features which make logging difficult.	Grade D-3. 50 to 90 miles	8 and 9
Impractical	Grade R-4. Tract over 6 miles from usable road.	Grade T-3. (Same as above)	Grade D-4. 90-120 miles	10 and over
Unproductive	Any one of the following factors will place the tract into this class: Extreme physical barriers preventing accessibility. Extreme low grade of land and timber. (See specifications for unproductive noncommercial forest land) If legal barriers, (Rights-of-way, etc.) or reservations for recreation, watershed or other use which will prevent logging for an indefinite period do exist, determination will be made by the County Assessors.			

<sup>1</sup>A manufacturing point is defined as: a location with planer facilities to produce finished (S 4 S) lumber (or equivalent) which has been, or appears will be, in continuous seasonal operation for 5 years and has an annual output of at least one million board feet.

<sup>2</sup>Class of Accessibility and Topography is determined by the sum of the numerical values of the grade average to tract in each of the divisions of this classification.

### Guiding Principles and Facts

This valuation has been based on the following principles, facts, and assumptions:

1. The valuation system is used in ad valorem taxation under existing laws. Proposed changes in taxation methods requiring legislation were not considered as assigned to this committee.
2. The system makes maximum use of the information collected under the Operation Manual for Reclassification of Private Forest Land as adopted by the Department of Revenue.
3. The system is designed to be of practical use to assessors.
4. The valuation system is designed around prudent business practices for growing trees.
5. This valuation system must be re-examined periodically and revised to meet economic changes.
6. Experience indicates variables within individual tracts east of the Continental Divide in Montana eliminate any calculable advantage that a favorable classification (accessibility and topography) may have over an average classification. Therefore, east of the Continental Divide only, favorable and average classifications have similar values.
7. This valuation does not consider any watershed or recreational values.
8. The marketing of miscellaneous forest products including poles, piling, posts, pulpwood and other minor items is of such sporadic and incidental nature that separate valuation thereof would prove extremely difficult and impractical for application by county assessors. In view of the difficulties involved, separate valuation of these products are not included; only the discounted potential value of future merchantable sawtimber stands has been calculated. Such valuation includes the miscellaneous forest products produced.
9. Christmas trees present a separate problem. Because of the extremely variable factors affecting the value of this product, difficulty of making an inventory thereof, and the local character of commercial Christmas tree operations, this product is not considered in this valuation.
10. Forest stands of seedling-sapling stand size are subject to so many variables for such a long period of time that no account value may be applied.

Calculated Valuation Factor for Private Forest Lands

1. The following calculations are based upon evidence cited at two public timber and timberland hearings held in Missoula on May 4, 1972, and in Helena on June 1, 1972.

2. Present value cubic foot volume of pole size trees (5 to 8.9 d.b.h.) is based on the following assumptions:

A. An average of 30 years or more may be required before growth will convert the cubic foot volume to a merchantable board foot volume. To compensate, the present value was discounted 80 percent.

B. Board feet per cubic foot ratio = 4.5 to 5.0.

3. Revised stand value tables for various counties or groups of counties prepared by the Department of Revenue show the average board foot volume per acre in trees 9 inches d.b.h. and over and the percent by species group. Similar information is shown for the cubic foot volume in trees 5 to 8.9 inches d.b.h. See tables 20, 20A, 21, 21A.

Table 20.--Details of west side board foot appraisals

	Group I Ponderosa pine	Group II Douglas-fir, larch-spruce	Group III White fir, hemlock, lodgepole pine
Lumber selling price <sup>1</sup> (including chips and miscellaneous byproduct uses)	\$114.44	\$93.71	\$84.62
Profit and risk allowance <sup>2</sup> (10.7 percent of selling price)	- 12.25	- 10.03	- 9.05
Manufacturing <sup>3</sup> (including chips, etc., at 12 logs/thousand)	- 45.24	- 41.73	-- 35.07
Subtotal value	56.95	41.95	40.50
Overrun percent <sup>4</sup>	12	16	17
Value (log scale) at mill	63.78	48.66	47.39
Stumpage after logging costs (logging cost for 10,000 board feet/acre)			
Favorable @ \$34.57	29.21	14.09	12.82
Average @ \$41.91	21.87	6.75	5.48
Difficult @ \$50.55	13.23	---	---
Wholesale value per thousand board feet (at 25 percent)			
Favorable	\$ 7.30	\$ 3.52	\$ 3.21
Average	\$ 5.47	\$ 1.69	\$ 1.37
Difficult	\$ 3.31	---	---

<sup>1</sup>Five year averages, 1967-1971, of W.W.P.A. Lumber Price Trends and Forest Service Manual 2423.46, Chip and Miscellaneous Byproduct Utilization Averages.

<sup>2</sup>Forest Service Manual 2423.64, Profit Ratio Determination; Table 6, Ratio Equivalent.

<sup>3</sup>Four year averages, 1968-1971, Forest Service Manual 2423.46, Chips & Etc.," and 2423.52, "Manufacturing."

<sup>4</sup>Five year average, 1967-1971, Forest Service Manual 2423.22, "Base Period."

Table 20A.--Details of west side cubic foot appraisals.

	Favorable	Average	Difficult
<b>Value at 10,000 board feet/acre<sup>1</sup></b>			
Species Group I	6.97	5.23	3.16
Species Group II	3.36	1.61	
Species Group III	3.07	1.31	
Wholesale value (based upon percentage of species group volumes)			
Group I @ 4.97 percent	.346406	.259931	.157052
Group II @ 37.52 percent	1.260672	.604072	
Group III @ 57.51 percent	1.765557	.753381	
Sum      100%	3.372638	1.617384	.157052
Total wholesale thousand cubic foot value/acre	\$3.37	\$1.62	\$0.16

<sup>1</sup>Board foot to cubic foot conversion factor: .9553868 = 20 percent of 4.776934 board feet. This conversion factor allows an 80 percent discount for the pole size timber as well as converting board foot volume to 1.0 cubic foot equivalent value.

Table 21.--Details of east side board foot appraisals

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Lumber selling price <sup>1</sup> (including chips and miscellaneous by product uses.)	\$ 75.95
Profit and Risk Allowance <sup>2</sup> (10.7 percent of selling price.)	- 8.13
Manufacturing costs <sup>3</sup> (includes chips, etc., for all grades and species.)	- 26.17
Subtotal value	41.65
Overrun percent <sup>4</sup>	17%
Value (log scale) at mill	\$ 48.73
Stumpage after logging cost: (logging cost for 7,000 board feet/acre)	
Favorable @ 40.42	8.31
Average @ 47.93	.80
Wholesale value per thousand board feet (at 25 percent)	
Favorable	\$ 2.08
Average	\$ .20

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<sup>1</sup>Five year averages (1967-1971) of Forest Service Manual 2423.4,  
Average East Side Zone Prices.

<sup>2</sup>Forest Service Manual 2423.64, Profit Ratio Determination; Table 6,  
Ratio Equivalent.

<sup>3</sup>Four year averages (1968-1971) of Forest Service Manual 2423.52,  
Manufacturing; and Forest Service Manual 2423.46, Chip and Miscellaneous  
Byproduct Utilization Averages.

<sup>4</sup>Five year average (1967-1971) of Forest Service Manual 2423.22,  
Base Period.

Table 21A.--Details of east side cubic foot appraisals

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.9553868\* of board feet 25 percent wholesale      Favorable      Average  
value at 7,000 board feet per acre

Species Group III (Values are total wholesale thousand cubic foot value)	\$1.99	\$.19
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\*Board foot to cubic foot conversion factor.

NEBRASKA<sup>83</sup>

Because there is a limited amount of forest land in Nebraska, no statutory provisions, regulations, or assessment guidelines deal specifically with the assessment and taxation of this type of property. Commercial timberland is generally included in the lowest grassland classification; noncommercial forest is largely classified as waste land. In all cases, the assessments include no additional valuation for standing timber. Severed timber associated with a commercial operation is usually assessed as inventory.

## NEVADA

Under the provisions of Senate Bill No. 167, classified agricultural and open space real property is appraised and assessed for property tax purposes on the basis of its value in current use. Agricultural land qualifies for assessment under this law if it has been devoted to an accepted agricultural use for at least 3 consecutive years immediately preceding the date of assessment. Agricultural use is defined as the current employment of real property as a business venture for profit which produced a minimum gross income of \$2,500 during the preceding calendar year from agricultural pursuits, including growing, harvesting, and selling timber.

The county assessor determines and records both the full cash value for current use and the full cash value for potential use. When land that is classified and assessed under the provisions of this law become declassified, deferred tax becomes payable. This deferred tax is equal to the difference between the taxes paid on the current use assessment and those which would have been due on the potential use assessment, for a period of up to 84 months. A penalty of 20 percent of the accumulated deferred tax is levied each year in which the owner fails to give notice of a change in the use of classified land to a non-qualifying use.

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<sup>83</sup>Nebraska Tax Commissioner, Lincoln. 1977. Personal correspondence.

## NEW HAMPSHIRE

Under New Hampshire law<sup>84</sup> timber is subject to a 10 percent yield tax based on the stumpage value at the time of harvest in lieu of the general property tax. Mature timber which an owner fails to cut when it has arrived at a degree of maturity most suitable for its use becomes subject to the general property tax, provided that such failure to cut, in the opinion of the assessing officials, unreasonably deprives the local taxing jurisdiction of revenue.

In addition to the normal yield tax described above, an additional tax of 2 percent on the stumpage value is assessed and collected in the same manner. It is paid into the State Treasury to cover interest, retirement of bonds and other indebtedness incurred by the State.

The Current Use Assessment Law<sup>85</sup> provides for qualifying open space lands, including farm land, forest land, wild land, inactive farm land, recreation land, wet land, and flood plains, to be taxed at current use values. This act established the Current Use Advisory Board to prepare a schedule of criteria and values for current use assessment of open space land. This board meets at least annually to review all current use land criteria and values previously established, and to establish a new schedule to be recommended for the current tax year. The schedule of criteria and values for current use taxation is distributed to all selectmen and assessing officers who appraise open space land that is classified under the provisions of this law. The following information is from "Schedule of Criteria and Values" prepared by the Current Use Advisory Board, revised February 18, 1976.

### Criteria for Classification

#### Forest Land

Qualifying forest land means any tract of undeveloped land actively devoted to the practice of silviculture, subject to the following conditions:

1. The tract shall be at least 10 contiguous acres. Certified Tree Farms of less than 10 acres will qualify.
2. The tract shall be primarily used to grow and harvest repeated forest crops, including timber products, maple sap and Christmas trees.

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<sup>84</sup>Revised Statutes Chapter 79 (1955).

<sup>85</sup>RSA 79A, as amended by Chapter 372, Laws of 1973.

3. The tract of land shall support a reasonable stand of commercial forest trees for the location, topography, and soil conditions, or show evidence that the owner has taken or is taking steps to bring stocking of commercial forest trees to reasonable levels for this site.

4. The tract of land shall show evidence that the owner is following generally accepted forest improvement and harvest practices and is complying with State and local forest laws, rules, and regulations.

The assessing officials may require a written statement summarizing past forest accomplishments, present forest conditions and plans for future forest improvement and harvest on the tract of land.

#### Farm Land

Qualifying active farm land means:

1. Any tract of land with at least 10 acres actively devoted to agricultural or horticultural use, including, but not limited to the production of the following: livestock, livestock feed, food and fiber for human consumption, plants, flowers, and nursery stock.

2. Land actively devoted to agricultural or horticultural use having an annual gross value of products normally produced thereon totaling at least \$2,500 regardless of acreage.

#### Wild Land

Qualifying wild land includes any of these five categories:

Unproductive wild land.--A tract of unimproved land of at least 10 contiguous acres upon which there are no detrimental structures, and which by its nature is incapable of producing commercial agricultural or forest crops, and which is being left in its natural state without interference with the natural ecological process.

-or-

Productive wild land.--Unmanaged forest and farm land--A tract of unimproved land of at least 10 contiguous acres upon which there are no detrimental structures, and which by its nature is capable of producing commercial agricultural or forest crops, and which is now and has been for a minimum of the past 5 years left in its natural state without interference with the natural ecological process.

-or-

Inactive farm land.--(1) Any tract of land 10 acres or more which is being kept open by generally accepted methods, but not cropped. The land is used to preserve scenic qualities, improve wildlife habitat, and maintain an agricultural land reserve.

-or-

Inactive farm land.--(2) Any tract of land of less than 10 acres which is being kept open by generally accepted methods, but not cropped, and approved as open land by the local conservation commission or, in case such commission does not exist, the board of selectmen.

Natural preserve land.--A tract of unimproved land of any size upon which there are no detrimental structures. Its natural qualities, location, surroundings, and environment possess extraordinary educational, historical, biological, botanical, ecological, aesthetic, or recreational features of importance to preserve permanently in unmodified condition, which is now and has been for a minimum of the past 5 years left in its natural state without interference with the natural ecological process. This category includes, but is not limited to, tracts designated by the New England Natural Heritage Council as an approved natural area and duly recorded as such.

#### Recreation Land

##### 1. Qualifying recreation land means:

A. Any tract of land of at least 10 acres open to public recreational use without entrance fee and which also qualifies for current use assessment under other open space categories.

-or-

B. Any tract of undeveloped land regardless of size open to public access without entrance fee and which possesses unusual public recreational value because of its scenic, geological, historic, or ecological characteristics as recommended by an appropriate body designated by the board of selectmen. The final approvement shall rest with the board of selectmen.

-or-

C. Any tract of undeveloped land regardless of size, open to public access without entrance fee and which is an approved natural or historic area as designated by the New England Heritage Council, the National Register of Historic Places, or Registry of National Natural Landmarks.

2. There shall be no prohibition of skiing, snowshoeing, fishing, hunting, hiking and nature observation. If such recreational uses are incompatible with tracts classified under B or C, above, any or all may be prohibited upon recommendation of the appropriate recommending body and with approval of the board of selectmen.

### Wetland

1. Qualifying wetland includes any tract of unimproved land which by reason of wetness is being left in its natural state. "Wetland" may include border of unimproved land up to 100 feet in depth. Normally, the wet area consists of land which, for at least 7 months of a year, is either covered with standing water or whose water table is less than 6 inches from the surface.

2. Once accepted as wetland and assessed as such, the development of any portion of the qualifying parcel disqualifies the entire parcel for classification as wetland so long as the ownership remains unchanged.

### Flood Plain

Qualifying flood plain means any tract of land lower in elevation than the land-water boundary along a water course flowing at its 100-year flood level as determined by a responsible State or Federal agency, such as the N.H. Water Resources Board, the Soil Conservation Service, or the U.S. Army Corps of Engineers, and which meets the criteria for any of the other categories of open space land. Note: Land meeting criteria as open space in one category may include within their boundaries up to 10 percent of land in other open space categories without separate classification.

### Schedule of Current Use Values for Open Space Land

All use values are 100 percent evaluation and should be adjusted according to the prevailing equalization percentage in the taxing jurisdiction, according to the equalization ratio as determined by the Department of Revenue Administration.

### Forest Lands

Forest land values range from \$20 to \$35 per acre. Use values for forest land should be determined on the basis of these forest types:

1. Pine type.--Where more than 50 percent of the trees are white pine or red pine, assess use values toward the higher limits of the range.

2. Spruce-fir type.--Where more than 50 percent of the trees are red spruce, white spruce, and balsam fir, assess use values at the middle of the range.

3. Hardwood and all other types.--Where more than 50 percent of the trees are hardwoods, or other species not noted above, assess use values at the lower limits of the range.

If classified forest land is open to public recreational use or public access without entrance fee as defined under the preceding "Criteria for Recreation Land," the above use values shall be reduced by 20 percent as follows: Forest land values range from \$16 to \$28 per acre.

#### Farm Land

Values for the following uses range per acre as follows:

<u>Use</u>	<u>Dollars</u>
Production pasture . . . . .	20 to 100
Forage crops . . . . .	50 to 350
Horticultural crops (including orchards) . . .	150 to 500

If classified farm land is open to public recreational use or public access without entrance fee as defined under the preceding "Criteria for Recreation Land," the above use values shall be reduced by 20 percent as follows:

<u>Use</u>	<u>Dollars</u>
Permanent pasture . . . . .	16 to 80
Forage crops . . . . .	40 to 280
Horticultural crops (including orchards). . .	120 to 400

#### Wild Land

Values for the following uses range per acre as follows:

<u>Use</u>	<u>Dollars</u>
Wild land meeting criteria as unproductive wild land . . . . .	10
Wild land meeting criteria as unmanaged forest and farm land . . . . .	30 to 60
Wild land meeting criteria as inactive farm land . . . . .	20 to 100
Wild land meeting criteria as natural preserve land . . . . .	10

If classified wild land is open to public recreational use or public access without entrance fee as defined under the preceding "Criteria for Recreational Land," the above use values shall be reduced by 20 percent as follows:

<u>Use</u>	<u>Dollars</u>
Unproductive wild land	8
Unmanaged forest and farm land	24 to 48
Inactive farm land	16 to 80
Natural preserve land	8

#### Recreation Land

Recreation lands which qualify under section 1A in the preceding section on Recreation Laws shall be assessed as noted in each of the other categories. Recreation land which qualifies under section 1B or 1C of the preceding section on Recreation Lands shall be assessed at \$10 per acre less 20 percent for being open to public access without entrance fee or \$8 per acre.

#### Wetland

Values for wetlands are \$10 per acre. If classified wetland is open to public recreational use as defined under the preceding criteria for recreation land, page 118, the above use value shall be reduced to \$8 per acre.

#### Flood Plains

Lands located within a flood plain are required to meet criteria for other categories of open space land and shall be assessed according to use values for these other categories.

## NEW JERSEY

The Farmland Assessment Act of 1964<sup>86</sup> provides that land actively devoted to agricultural use might, upon application by the owner, be assessed for its productivity value in such use rather than on the basis of its market value. Agriculture is defined to include the production for sale of trees and forest products.

Qualifications

Agricultural land is assessed for property tax purposes on the basis of value in its current use if it meets the following qualifications:

1. The owner must submit an application for valuation to the assessor of the taxing district in which the land is located.
2. The land must be at least 5 acres in area.
3. The land must be actively devoted to agricultural or horticultural use and must have been so devoted for at least 2 years immediately preceding the tax year in issue. Land is deemed to be actively devoted to agricultural use when it meets the criteria listed above and
  - A. when the gross sales of agricultural products produced on the land, together with any payments received under a soil conservation program have averaged at least \$500 on the first 5 acres, and for all acreage above 5 acres have an average sale of at least \$5 per acre on the farmland and \$0.50 per acre on woodland during the 2-year period immediately preceding the tax year in issue, or
  - B. there is clear evidence that the requirements in 3A will be met within a reasonable period of time.

In valuing land which qualifies for farmland assessment, the assessor is to consider only those showing signs of value in agricultural use, and not the future value which the land has for non-agricultural uses. (N.J.A.C. 18:15-30). The assessed value of the land, under terms of the Farmland Assessment Act, should be the same percentage of its value in its current use. This conforms to the percentage of true value set up by the county board of taxation for real property in general (N.J.A.C. 18:15-37).

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<sup>86</sup>Laws of 1964, Chapter 48.

To perform "present use" assessment, the State Farmland Evaluation Advisory Committee, created by the 1964 Act, determines a range of values for each of the many classifications of agricultural land in various areas of the State.<sup>87</sup> Below is a copy of excerpts from the 1976 report of the Committee.

### Productivity Value

Assessment of farmland on the basis of its productivity value presents a number of problems. The main ones arise for two distinct reasons: (1) Exact measures of the innate productivity of the 215 soil types in New Jersey are not available although there is a scientific base for making reasonable estimates of productivity. (2) The productivity of farmland varies with its designed use.

One way to overcome the main problem is to combine the scientific knowledge available on the characteristics of the soils and their economic potential according to current uses in agriculture. Simplify the procedure by putting the 215 soil types into five rated soil groups, and four of the most common uses of land by farmers. Net income from the land is funded and allowed on the basis of the above rated capabilities.

### Agricultural Soil Grouping

New Jersey has a complete set of maps and a description of all of its soils. To aid in the assessing process, the agricultural soils have been categorized<sup>88</sup> into five<sup>89</sup> groups:

Group A--Very productive farmland. Suitable for permanent cultivation. With proper management, yields tend to be high. Usually the most desirable soil in the area.

Group B--Good farmland. Suitable for permanent cultivation. Yields are generally fairly high.

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<sup>87</sup> State of New Jersey. 1976. Thirteenth Report of the State Farmland Evaluation Advisory Committee 1976. 12 pp. Local Property Tax Bureau, Trenton, N. J.

<sup>88</sup> J.C.F. Tedrow productive capability of New Jersey soils, Department of Soils and Crops, Rutgers--the State University. Anon. 1965. A Soils Guide for Use in Connection with the Valuation, Assessment and Taxation of Land Under the "Farmland Assessment Act of 1965", Chapter 48, Laws of 1964. (N.J.S.A. 54:4-23.1 et seq.)

<sup>89</sup> There is a sixth group, Group F, which is land of no agricultural value, consisting of rock outcrop, rough stony land, coastal beaches and clay pits. Such land is not deemed eligible for assessment under the Farmland Assessment Act of 1964.

Group C.--Fair farmland. Suitable for permanent cultivation. Yields tend to be lower than those in Groups A and B. The limiting factors are usually shallowness, droughtiness, or excessive moisture.

Group D.--Rather poor farmland. Usually wet, stony, droughty, or otherwise unsuitable for permanent cultivation.

Group E.--Land unsuitable for tillage. Usually unsuitable because of excessive water, shallowness, stoniness, or droughtiness.

To place each soil into one of the five groups, the following factors are primarily used: general suitability of the soil for farming, mechanical composition, depth of the soil, drainage, stoniness, and other related properties. In addition to these factors, consider the availability of water, topography, soil erosion, and the degree of slope.

#### Land use Classes

The primary uses of agricultural land can be combined into four distinct classes: cropland harvested, cropland pastured, permanent pasture, and woodland. The woodland class is described below:

Woodland.--This is land producing trees. Woodlands are found on all soil groups; however, a large portion of this land is not suitable for other agricultural uses because of slope, drainage, soil type or rough, rocky topography. Its best agricultural use is in trees.

#### Deriving Ranges of Value for Farmland

Ranges in value of farmland were determined for each county by capitalizing the net income from farming. The general method of calculation is shown in New Jersey Exhibit A.

The values shown in table 22 reflect the committee's estimates of the value of farmland based upon its productive capabilities.<sup>90</sup> These suggested values may be modified in individual instances by special conditions such as availability of water, topography, soil erosion and the degree of slope. These values are designed as guidelines for the assessor. It remains the ultimate responsibility of the assessor to determine the assessed value of qualified farmland in accordance with the standards of the Farmland Assessment Act of 1964.

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<sup>90</sup>For the purposes of an example, the values for only 4 of the 21 counties in the State are included here. The State Farmland Evaluation Advisory Committee provides values for all counties.

Table 22.--Estimates of ranges in value of farmland based upon its productive capabilities

County	Soil Group	Crop land harvested			Crop land pastured			Permanent pasture			Woodland	
		Soil Rating	Value per acre	Soil Rating	Value per acre	Soil Rating	Value per acre	Soil Rating	Value per acre	Soil Rating	Value per acre	Soil Rating
Atlantic	A	120	\$ 528	120	\$ 264	110	\$ 97	110	\$ 24			
	B	100	440	100	220	100	88	100	22			
	C	70	308	70	154	80	70	90	20			
	D	40	176	40	88	70	62	80	18			
	E	10	44	10	22	60	53	70	15			
Bergen	A	120	720	120	360	110	132	110	33			
	B	100	600	100	300	100	120	100	30			
	C	70	420	70	210	80	96	90	27			
	D	40	240	40	120	70	84	80	24			
	E	10	60	10	30	60	72	70	21			
Burlington	A	120	312	120	156	110	57	110	14			
	B	100	260	100	130	100	52	100	13			
	C	70	182	70	91	80	42	90	12			
	D	40	104	40	52	70	36	80	10			
	E	10	26	10	13	60	31	70	9			
Camden	A	120	600	120	300	110	110	110	28			
	B	100	500	100	250	100	100	100	25			
	C	70	350	70	175	80	80	90	23			
	D	40	200	40	100	70	70	80	20			
	E	10	50	10	25	60	60	70	18			

(Balance of table omitted)

New Jersey Exhibit A.--Derivation of the Farmland Assessment Values

- A. The U.S. Census of Agriculture, published every 5 years, lists farm-land use acreages for each county. These acreage categories were combined into exclusive and easily identifiable land use classes of Cropland Harvested, Cropland Pastured, Permanent Pasture, and Woodland. The estimates of the acreage of land in each class, by county, for 1976, were projected on the basis of census data from 1959 to 1974.
- B. Various items in income and expenses used in determining net farm income were projected on the basis of estimates published by the U.S. Department of Agriculture and current data available in the Department of Agricultural Economics and Marketing, Cook College.
- C. The percentage of State farm income arising from agriculture in each county was projected for 1976 on the basis of census data from 1959 to 1974.
- D. State net farm income for 1976 was allocated to the counties on the basis of the ratios to gross farm income calculated under step C.
- E. Net income for each county was then capitalized according to a return of 10 percent.<sup>91</sup>
- F. The average value per acre of each land use class was determined for each county by the productivity rating shown below.

<u>Land Use Class</u>	<u>Productivity Rating</u>
Cropland Harvested	20
Cropland Pastured	10
Permanent Pasture	4
Woodland	1

- G. Value per acre for the classes of land was calculated for each county.<sup>92</sup>

<sup>91</sup>The capitalization rate of 10 percent reflects the cost for borrowed money and a return for the farmer's own labor.

<sup>92</sup>Only 4 of the 21 counties are listed here. Those interested in the figures for the other counties should refer to the Thirteenth Report of the State Farmland Evaluation Committee. 1976. 12 pp.

County	Cropland harvested	Cropland pastured	Permanent pasture	Woodland
- - - - - dollars per acre - - - - -				
Atlantic	440	220	88	22
Bergen	600	300	120	30
Burlington	260	130	52	13
Camden	500	250	100	25

(Balance of table omitted)

H. Class values in each county were adjusted in accordance with the ratings of the soil groups (see table 22).

#### NEW MEXICO

For the purposes of property taxation, qualifying agricultural land is valued on the basis of its productive capacity rather than on market value.<sup>93</sup> Agricultural land is defined to include land that is used to produce trees and forest products for sale.

For agricultural land (including forest land) to be eligible for modified assessment, it must have been used primarily for agriculture during the preceding year. Qualifying tracts must be at least 1 acre in area.<sup>94</sup>

The Property Tax Department (PTD) is responsible for adopting regulations for qualifying agricultural purposes. It is also responsible for adopting regulations for determining the value of agricultural land. These regulations include:

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<sup>93</sup>Property Tax Department. January 25, 1977. Personal correspondence.

<sup>94</sup>Section 72-29-9 NMSA 1953 (Supp. 1975 of the Property Tax Code).

1. Procedures for determining the productive capacity and the valuation of land in agricultural production.

2. Assurances that lands with similar productive capacities are valued uniformly throughout the State.

3. Procedures for periodic reviews of productive capabilities and the capitalization rates used in valuing agricultural land.<sup>95</sup>

Production Capacity of Agricultural Land:  
Implementation of Valuation Method<sup>96</sup>

The productivity capacity of agricultural land is determined by the income method of valuation based on the income derived or capable of being derived from the use of the land for agricultural purposes. If for some reason information about income is not available, the income is imputed to the land being valued from the use of comparable agricultural lands. The comparability of the land used for purposes of imputing income is determined on the basis of class. The various methods of determining class of agricultural land are described below. A determination of income from agricultural land is not required to be restricted to income from actual production on the land, because the basis for determination of value is on the land's capacity to produce.

Income

Income includes the net farm profits reported for Federal income tax return; the reasonable value of unpaid labor of the operator or the farm family; and the expense of depreciation on farm buildings and machinery.<sup>97</sup> Income is determined on the basis of the average annual income of the preceding 5 tax years, to allow for drouth or other natural conditions which might distort income in a given year. Income may also be determined from reference services such as the New Mexico Crop and Livestock Reporting Service, the Cooperative Extension Service, and the agriculture departments of State universities. When using sources other than Schedule F mentioned earlier, make adjustments for costs allowable on the Federal farm income tax return if such costs are not allowed in the income figure provided. Also, income from sources other than the Federal farm income return are to be closely matched to the class of agricultural land being valued so that the income properly reflects income from the class of agricultural land being valued.

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<sup>95</sup> Ibid.

<sup>96</sup> PTD Regulation 29-9:4.

<sup>97</sup> See Federal Regulation (I.R.C.) Sections 1.61-4, 1.162-12, and 1.167 (a)-6(b).

The Department may, by order made after Department investigation, determine annual income from various classes of agricultural land based on the land's capacity to produce agricultural products. This order, if made, shall consider determinations of other governmental agencies concerning the capacity of a particular class of agricultural land to produce agricultural products. Such an order implements the valuation method prescribed by Section 72-29-9 and assures that land classes determined to have the same or similar production capacity are valued uniformly throughout the State. This order would be issued before the last day of the tax year preceding the year in which the annual income amounts are to be used.

#### Capitalization Rate

Capitalization rate refers to a market rate of return expressed as a percentage. The capitalization rate is applied to the estimated net annual income to estimate the value of the productive capacity of the agricultural land. Capitalization, generally, is a mathematical process for converting the income derived from the property into value.

The capitalization rate to be used in valuing land used primarily for agricultural purposes may be set by the Department after investigating how to implement the valuation method prescribed by Section 72-29-9. The capitalization rate is issued before the last day of the tax year preceding the year in which the capitalization rates are to be used. The department reviews the capitalization rate at least once every 5 tax years. In setting the capitalization rate, consideration shall be made of the current interest rates for government loans, bank loans, Federal Land Bank loans and Production Credit Association loans.

Implementation of the method for valuing agricultural land is accomplished by applying the capitalization rate to the annual "income" per acre of the agricultural land, except in the case of grazing land. The capitalization rate is divided into the annual "income" per acre to arrive at the value per acre for property taxation purposes of the agricultural land being valued. "Income" as that term is used in this paragraph refers to the net income reported in Schedule F, mentioned earlier.

#### Classification of Agricultural Land<sup>98</sup>

##### General Classification

Irrigated agricultural land is all agricultural land receiving supplemental water to that provided by natural rainfall.

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<sup>98</sup>PTD Regulation 29-9:5.

Dryland agricultural land has no supplemental water supply. All lands that were previously irrigated, or dryland meeting the preceding classifications, but which are now participating in any of the various crop retirement programs such as the soil bank or acreage set-aside program sponsored by the U.S. Department of Agriculture, are still to be classified as irrigated or dryland until the program leaves the subject land. Show clear evidence that a change in land use is occurring, unless there has been a sale of the water rights or use of it for irrigation.

#### Method of Subclassification

The following sources classify agricultural land:

A. The land capability classification of the Soil Conservation Service is a rating of land according to its ability to produce permanently, to sustain production. It consists of eight classes. Classes I through IV are suitable for cultivation; Classes V through VIII are not. Classes II through VIII are broken into four subclasses that denote the special kind of limits acting on the soil. Also, nine land capability units are used to show a specific kind of condition.

This system is an interpretative rating that includes not only the physical factors of soil, but the availability of water and the effects of climate. It is designed primarily for soil management and conservation practices. Each land capability description carries with it specific recommendations for farming practices that were developed by actual farming experience to offset or allow for the existing production-limiting factors of the soil.

B. Natural land classification of soil by physiographic groups based on their general topographic, or slope, position. Further information regarding this classification is found in the current New Mexico County Assessor's Agricultural Manual.

C. Classification by series and type which is the classification used in the cooperative survey of New Mexico State University and the U.S. Department of Agriculture and by the Soil Conservation Service and which classify in a series-type grouping. Further information regarding this classification is found in the current New Mexico County Assessor's Agricultural Manual.

D. "Soil characteristics" are to be determined using the current New Mexico County Assessor's Agricultural Manual.

E. Weather data. The general weather pattern of an area is usually well known and presents no special problems. However, the possible presence of microclimatic zones should be considered. The National Weather Service, agriculture experiment stations, extension specialists, and others connected with growing conditions are sources from which weather data are obtainable.

F. Cost and availability of water. Irrigation districts and other water suppliers, boundaries are usually easy to obtain from the local conservancy district office or the State engineer's office in Santa Fe. The supply of water and its cost should be considered. Electric utility companies often have information on pumping costs and related charges. District taxes, where they are charged, should be ascertained as well as other water costs. Many areas are subject to charges related to reclamation and drainage. All of this information should be assembled for proper analysis. It is often helpful to plot the various areas of different water supply and cost conditions on a map covering each appraisal area.

G. Cropping information. Knowledge of crop production, yields, prices received, costs, and cultural practices is essential to many appraisals. This information is available from several sources. Publications of the New Mexico Crop and Livestock Reporting Service contain information on the kinds and amounts of crops grown.

The Extension Service issues bulletins, leaflets, and other publications on cropping information and problems. In addition, the service issues valuable data on methods and costs of production for various crops. These cost sheets make a good starting point for the gathering of income and expense data for specific crops. There are various sources of crop price history; among them are the New Mexico State University, packing houses, cooperatives and independent growers.

NEW YORK<sup>99</sup>

Real property is subject to ad valorem property taxes based on fair market value. Court decisions have equated "fair market value" with "full market value". However, the amount of the full market value of certified forest land that exceeds the forest land value ceiling established by the State Board of Equalization and Assessment is exempt from taxation, unless the land is converted to some other use. Timber is exempt from the property tax but is subject to a 6 percent yield tax at the time of harvest.

The Board conducts regular Statewide equalization surveys and assists local assessors with their appraisal responsibilities. Through the use of a market approach, the Board annually determines the average per-acre values of lands used in forest crop production. These average values are adjusted for different regions and forest condition classes.

## NORTH CAROLINA

Standing timber, pulpwood, seedlings, saplings, and other forest growth are exempt from property taxation.<sup>1</sup> In general, land is assessed for taxation on its "true value in money," which means its market value.<sup>2</sup> However, property that is in a qualifying agricultural, horticultural, or forestry use is assessed on the basis of its present use-value.<sup>3</sup> Present use-value is defined as the price at which the property would change hands between a willing and financially able buyer and a willing seller, neither being under any compulsion to buy or to sell, assuming that both of them have reasonable knowledge of the capability of the property to produce income in its present use and that the present use of the property is its highest and best use.

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<sup>99</sup>Division of Equalization and Assessment, Bureau of Property Valuation, Albany. 1977. Personal correspondence.

<sup>1</sup>General Statutes 105-275.

<sup>2</sup> Op. Cit., 105-283.

<sup>3</sup> Op. cit., 105-277.2 to 105-277.7.

### Qualifications<sup>4</sup>

For the purpose of this use-value assessment law, "forest land" means land and improvements constituting a forest tract actively engaged in the commercial growing of trees under a sound management program (i.e., under a program of production designed to obtain the greatest net return from the land consistent with its conservation and long-term improvement). "Agricultural land" is defined to include woodlands and wastelands that are part of a farm tract.

Qualifying agricultural land must consist of at least 10 acres per tract and have a gross income (including any payments received under a governmental soil conservation or land retirement program) averaging \$1,000 per year for each of the 3 years immediately preceding the year of the present-use assessment.

### Determination of Value

The tax supervisor of each county prepares a schedule of land values, standards, and rules to be used in determining the present use-value of qualifying properties. The State Department of Revenue provides instructions to assist the tax supervisors in this task.<sup>5</sup>

The method of developing the use-values for the different classes of qualifying lands varies from county to county. Both the income and market value approaches are used. Some counties provide a use-value schedule and an outline of the procedures used to derive them, while the other counties only provide the schedule of values. Of those counties that provide an outline of the procedures used in deriving use-values, the income approach is used most often.<sup>6</sup>

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<sup>4</sup> Op. cit., 105-277.2 and 105-277.3.

<sup>5</sup> Op. cit., 105-277.6.

<sup>6</sup> Pasour, E.C., L.E. Danielson, and D.F. Neuman. 1976. Agricultural use-value taxation in North Carolina, 1975 and 1976. Economics Information Report No. 48. Dept. of Economics and Business, N.C. State Univ., Raleigh. p. 12.

## NORTH DAKOTA

Under North Dakota's Woodland Tax Law<sup>7</sup> qualifying forest land is taxed at a flat per-acre rate in lieu of ad valorem taxes. County commissioners and the state forester determine an equitable per-acre rate on land approved for classification under this law. Applications for such classification must be approved by the state forester.

## OHIO

In general, real property is appraised and assessed for taxation purposes under Department of Tax Equalization rules 5705-3-01 through 5705-3-13. Under these rules, the potential value of property in its highest and best use, as well as the value in its present use, is considered in the appraisal process. However, qualifying agricultural lands, including forest lands, are assessed according to supplemental rules 5705-5-01 through 5705-5-07. Under these rules land is valued for taxation on the basis of its value in its current use only.

General Procedures for Assessing Real Property<sup>8</sup>Before Actual Appraisal

A county auditor proposing to make a general reappraisal prepares and submits to the Commissioner of Tax Equalization a detailed plan for such appraisal. This plan should include, among other things, an outline of the appraisal procedures to be followed and the expected date of completion. This plan must be followed after it has been approved by the Commissioner. Any changes or alterations must be approved by the Commissioner. If a county auditor wishes to employ a professional appraisal firm to make a complete or partial appraisal, approval of the Commissioner must be obtained for any contract entered with the firm.

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<sup>7</sup>Chapter 57-57 N.D.C.C.

<sup>8</sup>Rules 5705-304 through 5705-3-12.

### Adoption of Property Records

Each county auditor maintains a current property record for each parcel of real property in the county. The information in this record should be used with the actual viewing of the property by the appraiser, and any other pertinent information available, to estimate the true value in money of each parcel.

For agricultural land, specific information relating to the following factors should be recorded: soil type, topography, erosion, and drainage. In addition, land use (number of acres) should be classified as follows:

(a) Homesite	(d) Permanent pasture
(b) Tillable land	(e) Woodland
(c) Orchard	(f) Waste

The computation of agricultural land value shall include the following, insofar as applicable:

- (a) Price per acre for each grade and use of land.
- (b) Total land value for each tract of land, different grade, and use.
- (c) Total land value for the entire parcel.

### Coding of Real Property

Each property record is given a three digit number code. The first digit identifies the major land use group and the last two digits identify the sub-use or group. This is done so that the county auditor can furnish to the Department of Tax Equalization, upon request, an abstract of real property in which is set out in separate columns the aggregate taxable value of land and buildings for each of the five major groups of real property.

The five major land use groups are agricultural, mining, industrial, commercial, and residential. The agricultural group includes, but is not limited to, lands devoted to forestry.

### Review of Appraisal

Following the initial inspection and extension of true values on the property record card, each parcel of real property is reviewed in the field by competent appraisers. This review ensures that each property has been valued uniformly in relation to other properties. In making this review all factors affecting value are considered including:

- (1) Mathematical accuracy
- (2) Land classification and pricing
- (3) Listing accuracy:
  - (A) Building measurements

- (B) Construction features
- (C) Construction quality grade
- (D) Use of proper price schedule

(4) Proper application of depreciation and obsolescence

(5) Sales of comparable property for like use

If the reviewer finds that a property or properties have not been valued at true value, corrections shall be made as needed, to obtain the correct values, which will then be put on the property record. As part of the appraisal review the county auditor prepares or has prepared an analysis of recent real estate transactions comparing the appraisal value to the prices paid for real property to determine whether all property and classes have been appraised uniformly at 100 percent of true value.

#### Procedure After Reappraisal

After the appraisal is completed, the county auditor totals the "true value in money" for agricultural, industrial, commercial, and residential property in each taxing district, and prepares and files an abstract of these values with the Department of Tax Equalization. The abstract is only considered as a tentative abstract of appraised values.

To achieve uniformity of assessment among the 88 counties, and keeping in mind that there are variations in cost schedules, depreciation schedules, etc., used by the various appraisal firms, the Commissioner's staff reviews each appraised value abstract filed by the county auditors. The appraisals are reviewed in the field in light of the information the Commissioner has collected on recent real property sales and other information relating to real property values to determine whether all real property has been uniformly appraised at true value in money. After this review the staff recommends to the Commissioner whether or not the reported values should be accepted or rejected as reasonable estimates of true value. If rejected, the auditor makes the changes needed to ensure that the appraisals are reasonable estimates of true value.

#### Valuation and Assessment of Qualifying Agricultural Property<sup>9</sup>

Upon application by the owner, land devoted exclusively to agriculture including but not limited to forestry, is assessed for taxation on the basis of its current market value or the fair market value. Consideration is given to only those factors that affect the land's value for agricultural use. This value is the price at which the property would change hands on the open market between a willing buyer and seller, neither being under any compulsion to buy or sell, and both having knowledge of all relevant facts, if the highest and best use is exclusively

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<sup>9</sup>Rules 5705-5-01 through 5705-05-07.

agricultural with no other influence being present. Usually this value depends highly on the soil productivity of the parcel.

In the absence of sufficient farm sales where the price is determined solely on agricultural factors, the estimation of current agricultural use land is difficult. Because this type of value depends highly on the productivity of the soils on a given tract, it is logical, and can be demonstrated, that the current agricultural use land value can be estimated by the capitalization of the typical net income from crops on a given parcel of land, assuming typical management and yields for the type of soil there. Values estimated by this method will closely approximate actual market values of lands where the highest and best use is exclusively agricultural and unaffected by other uses.

Considerable information is available at state and county levels on soil types, typical yields, crop prices, cost of production and other factors needed to estimate agricultural uses land value by the capitalization method. To achieve a uniform appraisal and assessment of agricultural land in the 88 counties of Ohio, the Commissioner of Tax Equalization annually prescribes a Current Agricultural Use Value of Land Table or Tables to be used by all county auditors in a given tax year, together with other criteria set forth in these rules.

#### Current Agricultural Use Value Tables

The annual Current Agricultural Use Value of Land Tables are calculated and prepared by the capitalization of the typical net income from agricultural products before real property and income taxes, assuming typical management and yields for a given type of soil, as provided in the following rule.

The use of the income approach to develop annual Current Agricultural Use Value of Land Table or Tables that are accurate, reliable and practical requires careful attention to the many principles and techniques involved. It is essential that the typical or potential net income be based on the land capability under normal or typical management practices, yields, cropping or land use patterns, prices, costs and conditions in the area rather than the management ability or decisions of an individual owner or operator. To avoid erratic fluctuations of value caused by spot economic, market or climatic conditions, 5-year moving averages of prices, costs, cropping patterns and other factors are used where practical. In addition, the effect of changes in agricultural technology and economic relationships must constantly be re-evaluated. The Agricultural Advisory Committee keeps the Commissioner informed of such technological and economic changes.

The most critical determination is the capitalization rate. This rate is determined by comparison of net income, calculated as described in this rule, to known prices or market value appraisals of farms that have been sold or appraised under the conditions prescribed by the definition of current agricultural use value of land in Rule 5705-5-01. The synthesis of the capitalization rate by other than market data shall

be by a method that gives weight to the factors present in the market for such property.

Information shall be obtained from such agencies as Cooperative Extension Service, College of Agriculture, The Ohio State University; Ohio Agricultural Research and Development Center; USDA Soil Conservation Service; USDA Forest Service; USDA Economics and Statistics Service; Department of Agriculture of Ohio; Department of Natural Resources of Ohio, Federal Land Bank and other reliable sources.

### Soil Management Groups

Detailed soil surveys are available in more than half of the Ohio counties. In addition, many land use maps have been prepared for individual farms both in and outside surveyed counties. Information is available on more than 350 soil types that have developed under different geologic, slope and drainage conditions in Ohio. The agronomists of the Cooperative Extension Service, The Ohio State University, in the 1976-77 Agronomy Guide, (Bull. 472) have grouped these soil types from the eight Ohio Soil Regions into 63 soil management groups. The soils in each group have similar characteristics and properties. The bulletin lists a range for the minimum yields which should be obtained using good management from the soils in a given management group for the major field crops. The mid-point in the yield range is used to estimate production from a given soil management group. In future years, the current agronomy guide or a similar reliable publication or source will be used for soil productivity information.

### Land Capability Classes

Consideration is given to the land capability class of a soil as determined by the Soil Conservation Service. The class is based on the soil's suitability to grow various crops, and potential hazards considering slope, drainage, erosion and other factors. The typical land capability class for a soil management group is determined and is used as a base for calculation of values when the soils in a group fall in other than typical land capability class. Usually, the typical class for which the base value for a soil management group is calculated will be the class with the least hazard for the group. The major land capability classes are:

Land adapted for crops:

Class I--No special hazards, very good land from every standpoint.

Class II--Some hazards which require good conservation practice.

Class III--Several intensive hazards which require intensive conservation practices.

Class IV--Very severe hazards, needs very careful handling and management.

Land for permanent vegetation only:

Class V--Very frequent flooding or permanently wet.

Class VI--Moderate hazards to be overcome for pasture use.

Class VII--Severe limitations for grazing or forestry, very steep.

Class VIII--Not suited for cultivation, pasture or forests. Wildlife and recreation is the best use.

#### Non-land Production Costs

Information on typical non-land production costs shall be obtained from the best available sources. When the available information is for a base year other than the current year such prices shall be adjusted to a 5-year moving average basis by the use of the "Index of Prices Paid for Production Items, Interest, Taxes, and Farm Wage Rules," reported each June in USDA's Agricultural Prices, or other reliable sources.

#### Estimation of Net Income for a Rotation Acre of a Given Soil Management Group

The steps used to estimate net income are:

1. Determine the midpoint of the range of minimum yields for each major field crop for each soil management group.

2. Determine the gross income per acre for a given crop by multiplying the midpoint of yield by the 5-year average weighted price per unit, reduced by the percentage for management expense.

3. Deduct the 5-year average non-land crop expense from gross income to determine net income per acre.

4. Estimate the typical land capability class for each soil management group based on information from the Soil Conservation Service and the cropping pattern assigned from Division C of SCS. This multiplied by the net return per acre gives the contribution from the crop to the rotation acre.

5. The total of the net return from each crop in the rotation is the total net return to be capitalized into land value.

Adjustment for Land Capability Class Other Than Typical for  
Soil Management Group

Because the soils in a given soil management group occur in different land capability classes, a method must be provided for adjusting from the typical to the non-typical situation. The following is an example of the adjustment factors to be used to adjust from the land capability class for which the net return or value per acre was actually calculated to another class by multiplying such return or value.

Land capability class	ADJUSTMENT FACTORS	
	A To next lowest class	B To next highest class
I	-	1.26
II	.79	1.42
III	.70	1.73
IV	.58	1.10
V	.89	1.66
VI	.60	3.04
VII	.33	2.00
VIII	.50	-

These factors can be used to estimate net income per acre through the range of land capability classes for soils in a soil management group.

Capitalization Rate

The capitalization rate, used in the income approach, is best determined from the comparison of known net income to known sale prices of comparable property. In the absence of sufficient data of this type, the method of estimating the proper rate should be one that will best approximate market determined rates. Therefore, for the purpose of estimating the capitalization rate to be used in determining the base values of agricultural land, the use of the mortgage-equity method is prescribed. This method is widely used by knowledgeable appraisers of major commercial investment property. In making the rate determination, the 5-year running average of each of the following items will be used:

1. Typical term of years, percent of mortgage and return on farm mortgages as reported by Federal Land Bank and other sources.
2. Return on investors equity--extracted from market data.
3. Depreciation or appreciation expected in property (agricultural land) over the next 5 years. The moving average of the preceding 5 years of percentage increases or decreases in USDA Farm Real Estate Index for Ohio for March of each year over the previous year is to be used as the estimate of this term (i.e., if the 5-year average is 10 percent increase per year, this is the estimate of the appreciation for the total 5-year period that a prudent investor would expect).

After these terms have been determined, the overall capitalization rate is calculated by reference to compound interest tables.

To the capitalization rate, adjusted for land only, shall be added the effective real property tax rate. Determine this by multiplying the 5-year average State tax rate, shown in Department of Tax Equalization records, by 35 percent<sup>10</sup> and express it as a percent. Reduce the rate further to reflect the average effect of the reductions required by Section 319.301, R.C. The total of the two rates is the agricultural land capitalization rate. This should depict the rate of return a wise investor would expect from an average Ohio farm.

Make market analysis studies annually to determine the capitalization rate as implied by sales of farms. These are sold under the conditions prescribed in the definition of current agricultural use land value (Rule 5705-5-01). Make market appraisals by the Board's staff under the same assumptions. Estimate the net income for such studies for each farm as provided in this rule. Capitalization rates vary with the land capability class because of the different risk and operating costs. Market studies are designed to determine such differences in rates.

After capitalization rates have been estimated by the mortgage-equity and the market comparison method, assess the rates. Select capitalization rates for the various land capability classes on the basis of such assessment for use in preparing the value tables.

#### Per Acre Value

Determine the per acre value of each soil group by dividing the net return per acre by the proper rate. Values in Classes I through IV shall be the values for cropland. If land in these classes is used for other purposes such as forestry or pasture, the cost of converting from present use to crop use is deducted. Values in Classes V through VII shall be the value for pasture and woodland.

#### Use of Prescribed Agricultural Use Value of Land Tables by County Auditors

After the county auditor has determined that the application to value land at its agricultural use is complete and correct, the land described in the application is viewed to determine if it is devoted exclusively to agriculture. If the land meets this test, it is appraised for real property tax purposes as provided in these rules.

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<sup>10</sup>Land is assessed for taxation at 35 percent of full value.

The first step in the appraisal of land used exclusively for agriculture is to determine from county soil survey maps, soil maps of individual farms prepared by the Division of Land and Soil of the Department of Natural Resources of Ohio and/or the Soil Conservation Service, or other sources of information, the different soil types, land capability classes and land uses together with the acreage in each category for the tract or parcel. Guidelines will be issued at a later date to assist county auditors in those counties where detailed soil surveys are not available.

After delineation of the boundaries of the farm or tract on the soil map the acreage in each soil type and land capability class can be measured with a grid or planimeter. The standard soil survey map uses a scale of 4 inches to a mile thus each square inch is equal to 40 acres and a quarter square inch is equal to 10 acres. The enlargement of soil maps to a scale of 8 inches to a mile will allow for more accurate estimation of soil areas. Isolated areas of 5 acres or less in a mapping unit should be classified with the mapping unit surrounding or adjacent to it. When each soil type and land capability class has been identified and the acreage determined the information is to be listed on the property record card. Once this information is initially recorded and verified, a permanent inventory of soil information will have been established for a parcel, with very few exceptions, unless the property boundaries are changed.

The soil management group for each soil type is determined by referring to the list of soil types of the various Soil Regions of Ohio, issued separately from these rules. Contact the local Soil Conservation Service for information on soils not listed. These soil management groups are shown in the 1976-77 Agronomy Guide. Refer to the Current Agricultural Use Value of Land Table or Tables prescribed by the Commissioner for the given tax year to secure the per acre unit value for a given soil type and land capability class.

Because Land Capability Classes I through IV are suitable for general field crops, the cropland price is used for soil areas in these classes unless an investment in capital, such as clearing or drainage, is needed to convert the land from its present use, such as woods, to tillable cropland. If by simply plowing, etc., the land can be converted, then no adjustment is needed. Woodland prices for Classes I through IV in the prescribed tables allow for clearing and drainage in Classes I and II and clearing in Classes III and IV. Land Capability Classes V through VIII are priced as pasture or woodland according to prescribed tables.

In the classification of the various soil types into soil management groups and the calculation of minimum yields under good management, the hazards of the various soil types such as drainage, erosion, shallow, droughty or stony soils have been recognized and accounted for.

Reclaimed strip mine land often has a better agricultural potential than in its original state depending on the geological origin of the soil. Until better means are devised, reclaimed strip mine land used as

cropland shall be priced as Class IV land or such other classification as may be determined based on the slope of the ground and other soil characteristics or properties. If in wood and pasture, classify the land as Class VI in the proper use, unless another classification is justified as previously stated. The county auditor deducts from the value of each separate parcel of real property the amount of land occupied and used by a canal or used as a public highway.

The total "agricultural use land value" is entered on the real property record together with the "true value" of the land as determined in accordance with Section 2, Article XIII of the Ohio Constitution. Any difference in value is noted on the real property record.

In the event the land value of a parcel or tract, as calculated from the Current Agricultural Use Value of Land Tables, exceeds or is less than the value indicated by the sale of the parcel or comparable properties in the area where the consideration was determined, under the conditions prescribed by the definition of "Current Agricultural Use of Land" in Rule 5705-5-01, the current agricultural use value of the land shall be determined on the basis of such sale or sales.

#### Determination of Taxable Value

The taxable (assessed) value of agricultural land is equal to 35 percent of agricultural use land value. The land is then taxed at the local tax rate on this taxable value.

#### Special Tax Rate for Forest Lands<sup>11</sup>

Qualifying forest land and timber may be taxed annually at 50 percent of the local tax rate on its taxable value as determined under the general tax laws. Property qualifies for this preferential treatment if it consists of land bearing a stand of trees which has been determined by the Chief of the Division of Forestry to be suitable for classification. Furthermore, the owner must submit an application to the Division declaring that the land is devoted exclusively to forestry or timber growing, and the owner must exercise reasonable care to protect and maintain the forest in accordance with regulations prepared by the Division.

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<sup>11</sup>Sections 5713.22 to 5713.26.

## OKLAHOMA

Oklahoma has no special guidelines for the assessment of privately owned forests. The State constitution and the statutes provide the general guideline that ". . . all taxable real property shall be assessed annually . . . at not to exceed 35 percent of its fair cash value, estimated at the price it would bring at a fair, voluntary sale for its highest and best use for which such property was actually used during the preceding calendar year, or . . . was last classified for use if not actually used during the preceding calendar year. . . ." However, a new system for determining the "use value" of agricultural land was recently developed and implemented. So far, there has not been any special consideration as to whether or not a particular parcel of land is used as cropland, improved pasture, timber, or native pasture. Under future plans the Tax Commission hopes to furnish assessors with separate values or ratings for each of these uses where applicable.<sup>12</sup>

Use Value Ratio Study

The Oklahoma Tax Commission was instructed by the Chairman of the State Board of Equalization to develop "means of determining use values as a constant standard for internal use by the Commission so that counties can be compared with accuracy as to their implementation of use value assessment procedures."

Agricultural Use

The primary concern for implementing the use value provisions of Section 2427 is its relationship to and impact upon agricultural land assessed values and the best, fairest, and most accurate method of determining assessment ratios by which to grade the assessor's performance in assessment of these lands on use value basis.

This technique for valuation of agricultural lands is based primarily on the productivity of the soil. The agricultural use potential of land depends on many factors including soil type, rainfall, terrain, etc. These factors are combined into what the soil scientists call productivity indices. A productivity index has been set up for each county in the State. The productivity index for each county lists all soils in the county with the best or most productive given a ratio of not to exceed 100 with all others rated downward to the poorest or least productive.

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<sup>12</sup>Oklahoma State Tax Commission. 1977. Personal correspondence.

The assessor grades out or arrives at the number of acres of each type soil in each tract or farm by using the soil surveys with their accompanying aerial photo maps in counties where published. Where unpublished, copies of the maps and other data can be secured from the local Soil Conservation Service office. The map is overlaid with a dot grid, and the dots enclosed in any given tract are counted to arrive at the number of acres of different type soils in the tract. For the county assessor this would be a fairly difficult and time consuming job; however, once it is completed it would not have to be repeated again unless tracts or parcels are split, such as in a sale of a portion of a tract.

To arrive at a value by this method, the value of a productivity point must be determined. The best method or approach relies on the market for the determination of the value of a productivity point--this is supported by the Constitution and the Statutes. The basic difference between market and use value are those influences that can be related to value associated with the nearness of a parcel to metropolitan areas, highways, industrial areas, lake-front locations, or any other location that might add an undue influence to the value of the land. Once this influence is eliminated, the market value of the most remote property in any given county should closely approximate its use value.

#### Arriving at Use Value

##### Examples:

Select any tract sold that can be classified as a remote parcel. Grade out the parcel on the soil map with a dot grid to determine the number of acres of each type soil. Multiply the acres of each soil by the rating shown on the productivity index to arrive at the number of points for each soil type.<sup>13</sup> Total the points and divide into the market price paid for the remote parcel to arrive at the dollar value per product point (table 24). It is preferable to use three or more remote parcels. Total the productivity point value of each and take the average to arrive at a final dollar value per point to be used for calculation of use value on all the agricultural land in a county.

Also, in the case of Oklahoma and Tulsa counties, where for all practical purposes it would be impossible to obtain sales of parcels that would reflect the proper use value on a remote parcel basis, it would be possible to use values established in the adjoining counties on an average basis and determine Oklahoma and Tulsa county use values on identical or comparable soil types.

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<sup>13</sup>For a partial example of a county productivity index with a schedule of points for various soil types, see table 23.

Table 23.--Productivity index and relative rating for the soils of  
 "Example" County, Oklahoma<sup>1</sup>

Group	Map symbol	Soil name	Rating
1	BeA	Bethany silt loam, 0 to 1% slopes	100
	PkA	Pond Creek silt loam, 0 to 1% slopes	
2	Br	Brewer silty clay loam	100
	Ca	Canadian fine sandy loam	
	Da	Dale silt loam	
	Mc	McLain silty clay loam	
	Ra	Reinach very fine sandy loam	
3	KfB	Kingfisher silt loam 1 to 3% slopes	88
	MsB	Minco silt loam, 1 to 3% slopes	
	NrB	Norge silt loam, 1 to 3% slopes	
	PkB	Pond Creek silt loam, 1 to 3% slopes	
	*	*	*
21	GdD3	Grandfield soils, 3 to 8% slopes, severely eroded	29
	NaD3	Nash-Quinlan complex, 3 to 8% slopes, severely eroded	
22	Tv	Tivoli fine sandy loam	18
23	QrF	Quinlan-Rock outcrop complex, 12 to 30% slopes	18
	VrE	Vernon-Rock outcrop complex, 5 to 15% slopes	

<sup>1</sup>Portion of table is omitted.

Table 24.--Determining dollar value per point for "Example" County, Oklahoma

Example: Remote Parcel

Symbol	Soil name	Slope	Acres	Rating	Points	Consideration	Per acre	Per point
CuD	Grant-Quinlan complex	5-8	46	53	2,438			
NRC	Norge silt loam	3-5	202	65	13,130			
QdE	Quinlan-Dill complex	5-12	113	29	3,277			
DuD	Dill-Quinlan complex	5-8	58	41	2,378			
SNE	Shellabarger-Albion complex	5-12	102	41	4,182			
MSC	Minco silt loam	3-5	62	65	4,030			
MSB	Minco silt loam	1-3	31	88	2,728			
P <sub>w</sub>	Port soils frequently flooded	---	2	53	106			
PkB	Pond Creek silt loam	1-3	2	88	176			
NRB	Norge silt loam	1-3	22	88	1,936			
Totals Sec. 19, 12N, 9W				640	34,381	\$199,750	\$312	5.81
PkA	Pond Creek silt loam	0-1	80	100	8,000			
NRC	Norge silt loam	3-5	4	65	260			
NRB	Norge silt loam	1-3	8	88	704			
RcC2	Renfrow clay loam, eroded	2-5	55	41	2,255			
KRA	Kirkland silt loam	0-1	9	76	684			
RbB	Renfrow silt loam	1-3	4	65	260			
Totals NW 1/4 Sec. 18, 13N, 5W				160	12,163	\$ 75,000	\$469	6.17
DND	Darnell-Noble complex	1-8	39	29	1,131			
GdC	Grandfield fine sandy loam	3-5	12	53	636			
NbC	Noble fine sandy loam	3-5	24	53	1,272			
CdB	Grandfield fine sandy loam	1-3	5	76	380			
Totals W Sec. 30, 12N, 10W				80	3,419	\$ 22,750	\$284	6.65 3=6.21
Average value per point = 18.63								

## OREGON \*

The State of Oregon has several tax laws related to forest land and timber. Three of these laws provide for ad valorem assessments of forest properties: (1) Western Oregon Ad Valorem Tax, (2) Western Oregon Small Tract Optional Tax, and (3) Special Assessment of Forest Lands Act.

Western Oregon Ad Valorem Tax<sup>14</sup>

Taxation

This law applies to forest properties that are west of the summit of the Cascade Mountains. Under this law, qualifying forest lands are valued for property tax purposes on the basis of their value as forest land and not on the value that they may have in some higher or better use. The timber thereon is valued for taxation in the following manner:

1. Reproduction timber (defined as trees under 12 inches d.b.h. outside bark) is exempt.
2. Young growth timber (defined as timber greater than 12 inches d.b.h. outside bark and not more than 90 years old) is valued at 30 percent of its "immediate harvest value" (defined below).
3. Old growth timber is generally valued for taxation purposes at 30 percent of its immediate harvest value. However, on those tracts where the average volume of old growth timber harvested annually over the three preceding years is less than one-thirtieth of the remaining old growth timber volume as of January 1, one year prior to the assessment date, it is valued at 25 percent of its immediate harvest value.
4. An additional tax is levied against the value of timber when it is harvested. If the taxable value of harvested timber was established during the preceding year at 30 percent of its immediate harvest value, the additional tax is equal to the amount of tax that would have been due had the timber been valued at 70 percent. Timber that was valued at 25 percent of its immediate harvest value during the preceding year is taxed on 75 percent of this value at the time of harvest. The tax levied against harvested reproduction timber is based on 100 percent of its immediate harvest value. In all cases, the same rate percent of levy is applied that was applied to similarly located properties.

When property that has been designated as forest land under this law is removed from that designation, a tax is levied that is equal to the difference between the taxes that would have been due during the

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<sup>14</sup>ORS 321.605 to 321.680, OAR 150-308.234, and OAR 150-321.618(3).

\* See editor's note, end of this chapter, page 156.

preceding 5 years, had the property not been so designated, and the taxes that were actually due during that same period. Also, interest is charged at the rate of 6 percent per annum from the dates that the increased taxes would have been payable.

### Qualifications

Property must meet the following requirements to qualify for taxation under the provisions of this law:

1. The area to be designated must be at least 2 contiguous acres in one ownership.

2. It must be land which either is being held or used for the predominant purpose of growing and harvesting trees of a marketable species and has been designated as forest land, or is land the highest and best use of which is the growing and harvesting of trees.

3. The land must meet one of the following minimum stocking requirements:

- A. If the trees are being grown for logs, poles, or pilings the land must contain at least 60 percent of the number of trees per acre recommended in the rules established by the state forester, or
- B. If trees are being grown for Christmas trees or ornamental purposes, the land must contain at least 1,000 trees of a marketable species per acre upon initial planting or 500 trees per acre in wild land culture, or
- C. The owner must submit to the assessor a plan for establishing trees which will meet one of the above minimum stocking requirements and the owner must begin implementing the plan by the time that the application for designation as forest land is filed.

4. The land is not classified as reforestation land under ORS 321.255 to 321.355<sup>15</sup> or assessed under the Western Oregon Small Tract Optional Tax.

### Appraisal

Each year, the Department of Revenue appraises forest properties in each county west of the Cascade Mountains according to the provisions of ORS 321.605 to 321.680. The results of these appraisals are available

<sup>15</sup>A fixed annual fee is levied on lands classified as reforestation lands. This fee is equal to 10 cents per acre per year on classified lands in western Oregon and 5 cents per acre per year in eastern Oregon. The timber is subject to a yield tax of 12.5 percent at the time of harvest.

to the various county assessors. The assessors are provided per-unit immediate harvest values of timber, true cash values of forest lands, and supporting data necessary to complete the assessment of such properties.

The immediate harvest value of timber is the amount that it would sell for at a voluntary sale made in the ordinary course of business if sold for harvest within 3 years from the date of sale. Determine the value from sales of public and private timber to be harvested within 3 years under the terms of the sale, from sales of private timber of an amount that can be harvested within a 3-year period. Where sales are lacking, use methods designed to arrive at nearly the same value. The method of determination allows for species, quality, volume, age, disease, defect and breakage, stand density, costs of removal, accessibility to point of conversion, terrain of the site and surrounding area, and other relevant factors. The immediate harvest value is determined by September 1 of each year and is used to compute the assessed value on the following January 1.

An appraisal of the various classes of timber includes the determination of the unit value and its application to the timber class inventory volume. The Department of Revenue provides unit values. Establish inventory volumes as follows:

#### Classification of Timber Over 150 Years Old

A. Use the cruised inventory volumes as long as the cruise is not over 14 years old and, the timber volume has not been substantially reduced by wind, insects, fire, harvesting, or other natural means.

B. If harvesting operations reduce timber volume, use the weakened cruised inventory volumes in accordance with harvest reported under 321.650. Owners must report harvest as of January 1 of the year following harvest, and subsequent years in accordance with provisions of (A).

C. If the timber volume is substantially reduced by natural causes, adjust the inventory as of January 1 of the following year to reflect the remaining volume. The stand shall be physically reinventoried as soon as possible thereafter.

#### Classification of Timber 100 to 150 Years Old

A. The cruised inventory volumes shall be used as long as the cruise is not over 9 years old and the timber volume has not been substantially reduced by wind, insects, fire, other natural occurrences, or by harvesting.

B. If the timber volume is reduced by harvesting, the cruised inventory volumes depleted in accordance with harvest reported under 321.650 shall be used as of January 1 of the year following the harvest and subsequent years in accordance with provisions of (A).

C. If the timber volume is substantially reduced by natural causes, the inventory shall be adjusted as of January 1 of the following year to reflect the remaining volume and the stand shall be physically reinventoried as soon as possible thereafter.

Timber Classified as "A" Young Growth

A. If the timber volume has not been substantially reduced by natural occurrences or by acts of man since it was physically cruised, the cruised volumes shall be used if not over 4 years old, and cruised volumes adjusted for growth shall be used if the cruise is not over 11 years old.

B. If the cruise is over 11 years old, the timber shall be physically reinventoried.

C. If the timber volume has been substantially reduced by natural occurrences or by acts of man, the inventory shall be adjusted as of January 1 of the following year to reflect the remaining volume and the stand shall be physically reinventoried as soon as possible thereafter.

D. If the timber volume has been reduced by partial cutting practices, the timber volume may be determined by adjustment of the cruise for growth, provided the cruise is not over 8 years old.

Timber Classified as "B" Young Growth

A. If the timber volume has not been substantially reduced by natural occurrences or by acts of man since it was physically cruised, the cruised volumes shall be used if not over 3 years old, and the cruised volumes adjusted for growth shall be used if not over 11 years old.

B. If the cruise is over 11 years old, the timber shall be physically reinventoried.

C. If the timber volume has been substantially reduced by natural occurrences or by acts of man, the inventory shall be adjusted as of January 1 of the following year, to reflect the remaining volume and the stand shall be physically reinventoried as soon as possible thereafter.

D. If the timber volume has been changed by partial cutting practices, the timber volumes may be determined by adjustments of the cruise for growth and depletion providing the cruise is not over 6 years old.

Timber Classified as "C" Young Growth

A. If the timber volume has not been substantially reduced by natural occurrences or by acts of man since it was physically inventoried, the cruise volumes may be used if not over 3 years old, and the

cruised volumes adjusted for growth may be used if not over 14 years old.

B. If the cruise is over 14 years old, the timber shall be physically reinventoried.

C. If the timber volume has been substantially reduced by natural occurrences or acts of man, the inventory shall be adjusted as of January 1 of the following year, to reflect the remaining volume and the stand shall be physically reinventoried as soon as possible thereafter.

D. If the timber volume has been changed by partial cutting practices, the timber volumes may be determined by adjustments for growth and depletion providing the cruise is not over 9 years old.

Timber Classified as "D" Young Growth

A. If the timber volume has not been substantially reduced by natural occurrences or by acts of man since it was physically inventoried, the cruise volumes may be used if not over 3 years old, and the cruised volumes adjusted for growth may be used if not over 8 years old.

B. If the cruise is over 8 years old, the timber shall be physically reinventoried.

C. If the timber volume has been substantially reduced by natural occurrences or acts of man, the inventory shall be adjusted as of January 1 of the following year, to reflect the remaining volume and the stand shall be physically reinventoried as soon as possible thereafter.

D. If the timber volume has been reduced by partial cutting practices the timber volumes may be determined by adjustments for growth and depletion providing the cruise is not over 6 years old. An inspection in each 6-year period will be made for all timber stands. Aerial photography may be used to facilitate the inspection. The inspection must be sufficient to determine if, in addition to the reported reductions of the volume, other substantial reductions to the volume have occurred.

Timber classified as A, B, C, or D Young Growth is defined by the Department of Revenue for timber inventory and valuation purposes. In all sections, the words "substantially reduced" means a change in inventory volume to an extent which a qualified forester would reasonably conclude would affect the volume of the inventory by more than 10 percent.

Western Oregon Small Tract Optional Tax<sup>16</sup>Taxation

This law applied to forest land west of the Cascade Mountains which is not classified as reforestation land under statutes 321.255 to 321.355 or assessed under the Western Oregon Ad Valorem Tax and which, in the judgement of the state forester, is suitable for the production of timber and is being used mainly for that purpose. Under this law, qualifying forest land is taxed on its productivity value. The timber thereon is exempt from ad valorem assessments.

Qualifications

Forest land must meet the following criteria to be classified and taxed under this law:

1. The land must not be used for purposes incompatible with the cultivation of timber, under generally accepted principles of good forestry.

2. The average age of the timber on the forest land must not be over 60 years. However, land bearing timber of an average age of 60 years or less when classified may continue under such classification until the average age of the timber reaches 90 years. If the State forestry agency determines that the forest land proposed to be classified consists of areas of substantially different age classes, the agency may determine the average age for each area and consider each area separately.

3. The land must be used for the predominant purpose of growing and harvesting trees of a marketable species; such trees must be well distributed over the area to be classified.

4. Only owners having a total ownership in western Oregon not exceeding 1,000 acres shall be entitled to classify forest land under this law. In computing an owner's acreage, total ownership shall be included even though portions of the forest land may not be eligible for classification. As used in this subsection, "total ownership" includes (a) forest land owned by the owner individually, (b) any forest land owned by any corporate or other group owner in which the applicant owner holds a share of ownership of 10 percent or more and (c) any land of the owner which is assessed under ORS 308.370 pursuant to ORS 321.770,<sup>17</sup> except land assessed under ORS 308.370 pursuant to ORS 321.770, which is used exclusively to grow culture Christmas trees.

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<sup>16</sup>ORS 321.705 to 321.765.

<sup>17</sup>ORS 321.770 provides that forest land eligible for classification under the provisions of the Western Oregon Small Tract Option Tax may, at the option of the owner, be assessed as farm use under ORS 308.370.

5. An owner electing to classify any eligible forest lands under the Western Oregon Small Tract Optional Tax Law must classify all of his or her eligible lands, except those assessed under ORS 308.370 pursuant to ORS 321.770.

6. No owner may have forest land classified under this law if such owner, or an individual having a share in ownership, has a spouse, sibling, ancestor or lineal descendant who owns or holds a share in ownership, of forest land already classified under this law. However, the State forestry agency may grant exceptions to this requirement when the applicant satisfactorily demonstrates that the combination of ownerships with the indicated relatives arose from bona fide business reasons other than a desire to circumvent the 1,000-acre limitation imposed by this section.

#### Classification

The owner of eligible forest land must apply to the State forestry agency for a determination and certification as forest land. If the agency determines that the land is eligible for classification, under this law the county assessor will be notified of such certification. The certification includes the average site class of the classified forest land. Whenever appropriate, the forestry agency may split the area into smaller areas for the application of different site classes.

The site classes are assigned according to the estimated total height of the dominant and codominant trees on the land at 100 years of age, as follows:

Site I . . . . .	200 feet
Site II . . . . .	170 feet
Site III . . . . .	140 feet
Site IV . . . . .	110 feet
Site V . . . . .	80 feet

These growth standards for site class determination apply to Douglas-fir sites. In the case of other species, the State forestry agency may apply the standards specified above or, if such standards are not deemed appropriate for a particular species, the agency may adopt different standards considered more appropriate for establishing five corresponding site classes for the species involved.

#### Appraisal

The county assessor appraises classified forest lands in accordance with the site class assigned to the land. The State forestry agency determines a value per acre for each site class by using an income approach that capitalizes the average annual net income over a rotation age including periodic and final harvests. A capitalization rate of 12 percent is used in this approach.

The income approach takes into consideration the following:

1. The volume of timber or quantities of products that the land and trees are capable of producing on each site class under full, reasonable and current management practices;
2. A rotation age consistent with the site class and with prudent management practices;
3. Thinning and other periodic harvest volume and value prior to final harvest;
4. Current immediate harvest value of the timber volume to be derived from all harvests; and
5. Costs of growing the timber volume.

The cash value per acre for each site class is then reduced as follows:

<u>Assessment date</u>	<u>Percent reduction</u>
January 1, 1976	50
January 1, 1977	40
January 1, 1978	30
January 1, 1979	20
January 1, 1980	10
January 1, 1981, and thereafter	None

#### Special Assessment of Forest Lands Act<sup>18</sup>

##### Taxation

This law applies to qualifying forest properties east of the Cascade Mountains. The land is taxed on its value as forest land and not on its value for some higher or better use. The timber on this land is not subject to the ad valorem property tax but rather a 5 percent severance tax is levied according to the provisions of the Eastern Oregon Severance Tax (ORS 321.405 to 321.520). When land designated as forest land under the provisions of this law becomes disqualified, a tax is imposed which is equal to the sum of the following:

1. The total amount by which the taxes assessed against the land would have been increased if it had not been valued according to the provisions of this law during the last 5 years.

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<sup>18</sup>ORS 321.805 to 321.825 and OAR 150-321.805 to 150-321.825.

2. Six percent interest on the amounts of the increased tax from the dates that the increased taxes would have been payable.

#### Qualifications

Land must meet the following qualifications in order to be eligible for taxation under the provisions of this law:

1. It must be used mainly to grow and harvest trees of a marketable species and be designated as forest land or land that achieves its highest and best use by the growing and harvesting of such trees.

2. The land must have growing upon it at least a poor stocking (as determined by standard forestry practice) of established seedlings of a marketable species or, if trees have been harvested from the land and no such stocking is present, the owner must be making reasonable efforts toward reforestation.

3. The land is not classified as reforestation land under ORS 321.255 to 321.355, nor is it assessed as farm land pursuant to ORS 308.370 or 308.395 or as property pursuant to ORS 308.505 to 308.990.

Editor's Note: As this manuscript was being prepared for publication, we received additional information not included in this chapter. See Extension Circular 888, The Forest Property Tax Law in Western Oregon, and Extension Circular 898, Forest Property Taxation in Eastern Oregon, both written by Charles F. Sutherland, Jr., Oregon State University, Corvallis, Ore.

#### PENNSYLVANIA

The assessment of forest land in Pennsylvania is affected by two acts. First, A Covenant Preserving Land Uses, Act 515,<sup>19</sup> as amended, enables certain counties to make a covenant with the owner of land in farm, forest, water supply, or open space uses. Under such a covenant the owner agrees to preserve the land in its current use and the county agrees to assess real property taxes on the value of the land in its use as restricted by the covenant. Second, under the Pennsylvania Farmland and Forest land Assessment Act, Act 319,<sup>20</sup> an owner of land devoted to agricultural use, agricultural reserve use, or forest reserve use may have the land assessed for taxation purposes on the basis of its value for such uses without consideration of its potential value in some other use.

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<sup>19</sup>Statutes Annotated Title 16. Secs. 11941 to 11947.

<sup>20</sup>Statutes Title 72, Secs. 5490.1 to .13.

### A Covenant Preserving Land Uses

To qualify for classification and assessment under Act 515 land must be devoted to one of the following land uses:

Farm land.--Any tract(s) of land in common ownership of at least 20 acres in area, used to raise livestock or grow crops.

Forest land.--Any tract(s) of land in common ownership of at least 25 acres in area used to grow timber crops.

Water supply land.--Any land used to protect watersheds and water supplies, including but not limited to land used to prevent floods and soil erosion, to protect water quality, and to replenish surface and ground water supplies.

Open space land.--Any land, including farm, forest and water supply land, in common ownership, of at least 10 acres in which site coverage by structures, roads and paved areas does not exceed 3 percent. Open space land includes land, the restriction on the use of which could (a) conserve natural or scenic resources, including but not limited to soils, beaches, streams, wetlands, or tidal marshes; (b) enhance the value to the public of abutting or neighboring parks, forests, wildlife preserves, nature reservations, or other public open spaces; (c) augment public recreation opportunities; (d) preserve sites of historic, geologic, or botanic interest; (e) promote orderly urban or suburban development; or (f) otherwise preserve open space without structures, roads and paved areas exceeding 3 percent of site coverage.

Furthermore, the land must be designated as farm, forest, water supply, or open space land in a plan adopted following a public hearing by the planning commission of the county or municipality in which the land is located. Also, the owner of such land must voluntarily covenant that the land will remain in its qualifying use for at least 10 years.

Use of the land for any other purpose than that designated in the covenant constitutes a breach of the covenant. If the covenant is breached the landowner has to pay the county the difference between the real property taxes paid and the taxes which would have been payable without the covenant, plus compound interest at the rate of 5 percent per year from the date of entering the covenant to the date of its breach or from a date 5 years before the date of its breach, whichever period is shorter.

### Farmland and Forestland Assessment Act

To be eligible for preferential assessment under Act 319, land must meet the minimum qualifications for one of the three eligible uses: (1) agricultural use, (2) agricultural reserve use, and (3) forest reserve. The minimum qualifications are defined in the following sections.

### Agricultural Use

To be eligible for preferential assessment land devoted to agricultural use shall meet either of the following requirements:

1. The land is presently in agricultural use and has been for the preceding 3 years and is not less than 10 contiguous acres.

2. The land is less than 10 contiguous acres, and has been in agricultural use for the preceding 3 years, and the owner can demonstrate to the assessor that the land has an anticipated yearly gross income of \$2,000.

A. Evidence of the land's anticipated yearly gross income of \$2,000 may be derived from the soil survey at the Pennsylvania State University; The National Cooperative Soil Survey; the United States Census of Agricultural Categories of Land Use Classes, if available; evidence of the land's capability to produce an agricultural commodity, including proof of income obtained from the previous 3-years' use; or such other evidence deemed necessary by the county assessor.

B. Before July 1 of each year following preferential assessment the owner must establish to the county assessor proof of a gross income of \$2,000.

C. If the owner is unable to show that the land generated a gross income of \$2,000 or that the land would have generated \$2,000 except for circumstances beyond the control of the owner, the land shall be subject to roll-back taxes. Such land shall no longer be eligible for preferential assessment until the owner establishes new evidence that the income can be generated.

### Agricultural Reserve

To be eligible for preferential assessment, land devoted to agricultural reserves shall satisfy all of the following criteria:

#### Specific Requirements

All of the following requirements shall be met:

1. The land is not less than 10 contiguous acres in area.

2. The use of the land shall be noncommercial and no profit may result from uses thereon.

3. The land shall be open to the public and used for outdoor recreation or the enjoyment of scenic or natural beauty.

4. There may be no charge or fee for the use of the land.

5. There may be no discrimination on the basis of race, creed, color, sex, age or national origin against persons using the land.

6. At least 60 percent of the land is in the Soil Conservation Service capability classifications I through VI, excluding water and wetland areas. The six capability classes are:

- Class I. Soils having few limitations that restrict their use.
- Class II. Soils having some limitations that reduce the choice of plants or require moderate conservation practices.
- Class III. Soils having severe limitations that reduce the choice of plants or require special conservation practices, or both.
- Class IV. Soils having severe limitations that restrict the choice of plants, require very careful management, or both.
- Class V. Soils having little or no erosion hazard, but have other limitations impractical to remove, thus limiting their use largely to pasture, range, woodland, or wildlife food and cover.
- Class VI. Soils having severe limitations making them generally unsuited for cultivation and limiting their use largely to pasture or range, woodland, or wildlife food and cover.

Detailed descriptions of soil classifications may be obtained from the Soil Conservation Service.

#### General Considerations

General considerations for public use shall conform with the following:

1. Anyone who intends to use land in agricultural reserve for outdoor recreation or the enjoyment of scenic or natural beauty shall notify the owner, tenant, lessee, occupant, person in control of the premises, or caretaker of such property when possible, of the intention to do so.

2. The owner may deny access on an individual basis under conditions or circumstances which would result in undue likelihood of accident or damage to property.

3. If inherently hazardous conditions are apt to endanger life or property, the owner shall notify the county assessor of such hazardous conditions. Based on the conditions, the hazardous area may be temporarily or permanently closed to public use without affecting the preferential assessment.

Forest Reserve

To be eligible for preferential assessment, land in a forest reserve shall satisfy the following criteria:

1. Land presently stocked by forest trees producing 25 cubic feet per acre of annual growth, as per standards established by the American Forest Institute and the Department of Environmental Resources.
2. The land is not less than 10 contiguous acres.
3. Farm woodlots, contiguous to and held in the same ownership as agricultural use land are not required to conform to the 10 acre minimum forest reserve requirement.

Upon application by the owner, eligible land is valued for general property tax purposes on the basis of its value in the qualifying use. The assessor shall consider the available evidence of the land's capability for its particular use, such as the soil survey at the Pennsylvania State University, the National Cooperative Soil Survey, and the U.S. Census of Agricultural Categories of Land Use Classes.

The assessor keeps records of the fair market value and the use value of each parcel granted the preferential treatment under this Act. The assessor also keeps track of all annual changes in these values.

When land that is being assessed under the provisions of Act 319 is converted to a noneligible use, a roll-back tax is levied equal to the difference, if any, between the taxes paid on the basis of the preferential assessment and the taxes that would have been due had the land been valued as other comparable land within the taxing district. The tax is payable for the current tax year and the 6 preceding tax years, or the number of years of preferential assessment, up to 7, whichever is the smaller number, plus interest on each year's roll-back tax at the rate of 6 percent per year.

## RHODE ISLAND

Upon application, lands classified under the Farm, Forest and Open Space Land Act<sup>21</sup> are assessed on the basis of their value in present use.

### Definitions

Farm land.--Any tract(s) including woodland and waste-land, constituting a farm unit.

Forest land.--Any tract(s) bearing a dense growth of trees, including any underbrush thereon, that is self-perpetuating, or dependent upon its development by the planting and replanting of trees in stands of closely growing timber maintained under a forest working plan approved by the Chief of the Division of Conservation.

Open space land.--Any area, including forest land and farm land, the preservation or restriction of the use of which would (a) maintain and enhance the conservation of natural or scenic resources, (b) protect natural streams or water supplies, (c) promote conservation of soils, beaches, or wetlands, (d) enhance the value to the public of abutting or neighboring parks, forest, wildlife preserves, nature reservations or sanctuaries, or other open space, (e) enhance public recreation opportunities, (f) preserve historic sites, or (g) promote orderly urban or suburban development.

### Assessment at Full and Fair Cash Value

All property liable to taxation is assessed at its full and fair cash value or at a uniform percentage thereof, not to exceed 100 percent, to be determined by the assessors in each town or city; provided, however, that in assessing real estate classified as farm, forest, or open space land, the assessors shall consider no factors other than those which relate to the current use of the land without regard to neighborhood land use of a more intensive nature.

### Roll-Back Taxes

When land classified and assessed under the provisions of this law is converted to a use other than farm, forest, or open space, it shall be subject to an additional tax, referred to as a roll-back tax. The roll-back tax is equal to the difference, if any, between the taxes paid or payable on the basis of the valuation and the assessment authorized

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<sup>21</sup>General Laws, Title 44.

under this law and the taxes that would have been payable had the land been valued, assessed, and taxed as other land in the city or town, in the current year and in the two previous tax years. Land taken by right of eminent domain is not subject to the roll-back tax.

#### SOUTH CAROLINA<sup>22</sup>

Agricultural real property, properly classified, is taxed on an assessment equal to 4 percent of its fair market value for agricultural purposes, including forestry. Qualifying forest property means any land which is used to produce trees or on which forestry is practiced and for which the owner has applied for the preferential assessment.

#### SOUTH DAKOTA

For taxation purposes, real property includes the land; all buildings, structures, and improvements, including trees; all rights and privileges connected with the use of the land; and all mines, minerals, and quarries in and under the land.<sup>23</sup>

Lands from which trees are harvested for pulpwood or posts are assessed on the basis of market value with timber value added to that of the land (except as provided for in Section 10-4-4). Factors considered

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<sup>22</sup>State Tax Commission, Administrative Division. 1978. Personal correspondence.

<sup>23</sup>South Dakota Code, Section 10-4-2.

by assessors are terrain, grazing value, distance to market, and size of timber.<sup>24</sup>

The assessor determines and reports each year the acreages of timber within each district. The report indicates the acreages of natural and cultivated or planted forests, averaging at least 4 feet in height, and also specifies the kind of trees.<sup>25</sup>

Trees planted under the Timber Culture Act of Congress are not considered as an improvement on the land for purposes of taxation.<sup>26</sup>

#### TENNESSEE

All growing crops, including timber, are exempt from the property tax.<sup>27</sup> Forest land is assessed at 25 percent of its market value. It is based on evidence of sound, intrinsic and immediate value, for purposes of sale between a willing seller and willing buyer without consideration of speculative values. The following factors are considered in determining value:

1. location
2. current use
3. whether income bearing or non-income bearing
4. zoning restrictions on use
5. legal restrictions on use

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<sup>24</sup>Department of Revenue, Office of the Secretary. 1977. Personal correspondence.

<sup>25</sup> Op. cit., Section 10-7-8.

<sup>26</sup> Op. cit., Section 10-4-4.

<sup>27</sup> Tennessee Code, Annotated, pp. 67-517.

6. availability of water, electricity, gas, sewers, street lighting, and other municipal services

7. natural productivity of the soil, except that the value of growing crops shall not be added to the value of the land

8. all other factors and evidences of values generally recognized by appraisers as bearing on the sound, intrinsic and immediate economic value at the time of assessment.<sup>28</sup>

Forest landowners may also ask the county assessor to assess their land on its present value under the provisions of the Agricultural, Forest, and Open Space Land Act.<sup>29</sup> The present use value is equal to the value of the land in its current use, assuming that there is no possibility of it being used for another purpose.

The following guidelines are from the Agricultural, Forest, and Open Space Land Act.<sup>30</sup>

#### Definitions

Agricultural land.—Woodlands and wastelands which form a contiguous part of a farm-unit that is at least 25 acres in size.

Forest land.—Any 25-acre tract growing timber under a sound, sustained yield, management program or constituting a forest in the opinion of the State forestry agency.

Open space land.—Any area of land other than agricultural and forest land, of not less than 3 acres characterized principally by open or natural condition, and whose preservation would provide public benefits. This term includes greenbelt lands or lands primarily devoted to recreation.

#### Forest Land Classification Procedure

The landowner files a written application with the county assessor for classification and assessment under the provisions of the Act. If the county assessor determines that the land is forest land, it will be classified and included as such on the county tax roll.

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<sup>28</sup> Op. cit., pp. 67-606.

<sup>29</sup> Op. cit., pp. 67-650 through pp. 67-657.

<sup>30</sup>For agricultural and open space classification procedures, see pp. 67-654 and pp. 67-656, op. cit..

In determining whether any land is forest land, the tax assessor considers acreage, timber volume and type, actual and potential growth rates, and current management practices. The tax assessor may request and receive the advice of the State forestry agency to help determine the forest classification.

The application for forest land classification shall be made on State Board of Equalization forms, in consultation with the State forestry agency. It shall include a description of the land and its current use, aerial photographs, if available, and such other information as the tax assessor or State forestry agency may require.

#### Valuation

The current use of land, classified under the provisions of this Act, is considered to be its immediate most suitable economic use. It is assessed as though there were some firm legal prohibition on changing the use.

In determining the current use value of classified forest land, farm income, soil productivity or fertility, topography, susceptibility to flooding, rental value, and other factors are considered by the tax assessor.

If any land classified under the provisions of the Act is converted to a non-qualifying use, a rollback tax is levied equal to the amount of taxes saved because of the preferential treatment for each of the 3 preceding years for agricultural and forest land, and for the preceding 5 years for agricultural and forest land, and for the preceding 5 years for open space land. Lands converted to non-qualifying uses by virtue of a taking by eminent domain or other involuntary proceeding, except a tax sale, are not subject to rollback taxes.

TEXAS

The State taxes all property at market value.<sup>31</sup> Texas has no special provisions for the assessment of timberlands.

The timber is valued for taxation on the basis of market value. Where it has been sold separately and apart from land, though standing, it is taxable separately and apart from the land and to the owner. Timber that is purchased from the State and held by persons or corporations shall likewise be subject to assessments for taxes.<sup>32</sup>

UTAH

Real estate includes the possession of, claim to, ownership of, or right to land; and all timber belonging to individuals or corporations that is on the lands of this State or the United States, and plus all rights and privileges.<sup>33</sup> According to the State Tax Commission, forest lands are generally assessed as grazing land and taxed at local rates. Utah has no special provisions for the assessment of forest lands.

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<sup>31</sup>State Constitution, Article 8, Section 2.

<sup>32</sup>County Tax Assessor--Collector Instruction Manual, p. 35. Comptroller of Public Accounts. (n.d.)

<sup>33</sup>Property Tax Manual, p. 1, State Tax Commission, 1970.

## VERMONT

Forest land is taxed on the basis of its fair market value, interpreted as the value of the land in its highest and best use. However, the Governor's Forest Taxation Study Committee recently undertook a study to analyze the effects of alternative taxing systems on the management and productivity of forest property and to, perhaps, recommend a system which could possibly improve the level of management and production.<sup>34</sup>

The Study Committee concluded that though a modified property tax system alone will not protect and preserve open space lands it may help promote and prolong them. The Committee recommended that some towns should employ tax stabilization contracts to promote open space land use. Under such a contract, forest land could not bear a tax burden greater than \$1.50 per acre. In return for this preferential treatment the community would receive the services that the land provides as open space.

The Study Committee concluded that such contracts should be for a period of at least 15 years and that qualifying lands should be at least 25 acres in size. The Committee also recommended that each county should be responsible for the benefits and costs to be incurred from the adoption of a preferential tax system rather than adopting such a system Statewide.

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<sup>34</sup> Report of the Governor's Forest Taxation Study Committee, September 17, 1976. 33 pp.

## VIRGINIA

The 1950 Code

"When the surface of the land is owned by one person and the standing timber trees thereon are owned by another, the relative value of each shall be determined and the several owners assessed with the value of their respective interests."<sup>35</sup>

"When the surface and standing timber trees are owned by the same person, the value of the land, inclusive of the standing timber trees, shall be ascertained and assessed at such ascertained value."<sup>36</sup>

". . . when any timberland heretofore assessed, the owner of the timber on which is also the owner of the land, is reduced in value to the extent of two hundred dollars and upwards by the removals of the timber therefrom, the commissioner shall assess the land in its then present condition and reduce the charge for the same to the amount so assessed."<sup>37</sup>

Use-Value Assessment Law

An optional Land Use Assessment Law,<sup>38</sup> enacted in 1971, may also be applicable to forest land. This law permits localities which have adopted a land-use plan to make special assessments for agricultural, horticultural, forest and open space lands. Lands classified under this ordinance are assessed and taxed on the basis of the value that the land has in its present use.

The standards for classification, procedure for determining use-values, and the 1977 suggested use-values for real estate devoted to forest use are included in the following section.

Stocking.—The number of trees that are at least 3 inches, d.b.h. required to equal a total basal area (area in square feet of a cross section of the tree at d.b.h.) of 75 square feet per acre, or where such trees are not present, there shall be present tree seedlings, or tree seedlings and trees in any combination sufficient to meet the 10 percent stocking set forth in table 25.

<sup>35</sup>Code of Virginia (1950) Section 58-804(f).

<sup>36</sup> Op. cit., 58-804(g).

<sup>37</sup> Op. cit., 58-813.

<sup>38</sup> Op. cit., 58-769.4, et. seq.

Table 25.--Minimum number of trees to determine 7.5 square feet of tree basal area or 10 percent stocking required to be classified as forest land.

D.B.H. range	D.B.H. in 2-inch classes	Basal area per tree		Per acre	Per 1/5 acre	Per 1/10 acre
		(inches)	(square feet)			
up to 2.9	Seedlings			100	20	10
3.0 - 4.9	4	0.1257	59	12	6	6
5.0 - 6.9	6	0.1964	38	8	4	4
7.0 - 8.9	8	0.3404	22	4	2	2
9.0 - 10.9	10	0.5346	14	3	1	1
11.0 - 12.9	12	0.7466	10	2	1	1
13.0 - 14.9	14	0.0690	7	1	-	-
15.0+	16+	1.4845	5	-	-	-

Note: (A) Area 1/5 acre: circle, diameter 105 feet, 4 inches; square, 93 feet, 4 inches per side

(B) Area 1/10 acre: circle, diameter 74.6 inches; square, 66 feet

(C) Number of seedlings present may qualify on a percentage basis:

Example: 20 seedlings would be equivalent of 1.5 square feet of basal area (20 percent  $\times$  7.5 = 1.5)

### Productive Earning Power

The forest land productive earning power is determined by the soil series classification and current market prices for each county and city. The base species are selected according to the major forest type of greatest economic value in the county or city.

The annual productive earning power is computed by discounting the per acre gross dollar value of tree growth to the time of stand establishment, using a 6 percent compound rate of interest. The cost of establishing the stand will then be subtracted, leaving a net worth of the timber crop above the 6 percent compound interest allowance for the cost establishment.

### Determining Use-Value of Forest Land<sup>39</sup>

The productive earning power of land devoted to forestry is determined by many factors: soil type, base species, average yields, reforestation and management costs, current stumpage prices, maximum economic rotation age and a capitalization rate. See table 26.

Table 26.--Forest land use-values for real estate devoted to forest use under the land use assessment law

County/City	Suggested 1977 forest use values			
	Productive			Non-productive
	Fair	Good	Excellent	
Albemarle	125	190	265	50
Amelia	135	190	260	50
Augusta	100	155	220	50
Bedford	70	100	135	50
Chesapeake	125	175	240	50
Chesterfield	150	210	290	50
Clarke	105	150	230	50
Culpeper	135	190	265	50
Cumberland	125	175	240	50
(balance of table omitted)				

<sup>39</sup>Procedures for Determining Ranges of Use-Values, with 1977 Suggested Use-Values. State Land Evaluation Advisory Committee, Richmond. 1976. pp. 27-29.

The different soils which occur in each county will be listed alphabetically and given a timber productivity rating of fair, good or excellent. These ratings are determined in cooperation with the Soil Conservation Service and by using actual field measurements.

The two major species in Virginia are loblolly pine and oak. One of these two species is used as the base species, depending on the location of the county and the forest management practices in the area. Generally, loblolly pine predominates east of the Blue Ridge Mountains and oak predominates on the western side.

Average yields for the base species are obtained from existing yield tables for the productivity classes fair, good and excellent. The maximum economic rotation age is 40 to 50 years for pine and 80 years for oak. The yields in cords and board feet are converted to dollar yields using current average stumpage prices. The site preparation, planting and land management expenses per acre are subtracted from the gross income to obtain the net income per acre. The net income is divided by the maximum economic rotation age to obtain an annual net income per acre. The annual net income is then divided by a capitalization rate to determine the suggested value per acre for forest use. The value includes the use-value of the standing trees.

The capitalization rate includes interest, property tax and risk components. The interest and property tax components are the same as those developed for a county or city for agriculture use values. A risk component of 1.5 percent is added to compensate for possible loss from fire, disease, insects, ice storms, etc.

A value is suggested for non-productive forest land. This is land devoted to forest use, but is not capable of growing a crop of trees for commercial industrial use. Examples of this type of forest land are inaccessible sites, steep outcrops of rock and shallow soil on steep mountain sides, excessive steepness, heavily eroded areas, coastal beach sand, tidal marsh, etc.

Some forest lands may qualify for use value assessment under the classification of open space on agriculture land. Open space use includes real estate provided or preserved for (1) park or recreational purposes, (2) conservation of land or other natural resources, (3) floodways, (4) historic or scenic purposes, or (5) assisting in the shaping of the character, direction, and timing of community development.<sup>40</sup> Land classified as agricultural land may include, among other things, "... trees or timber products of such quantity and so spaced as to constitute a forest area meeting standards prescribed by the Director of the Department of Conservation and Economic Development, if less than 20 acres, and produced incidental to other farm operations."<sup>41</sup>

<sup>40</sup>Virginia Division of Forestry, August 20, 1976.

<sup>41</sup>For more information about classification of property as open space on agricultural land (for use-value assessment purposes) see pages

## WASHINGTON

The 1971 Forest Tax Law<sup>42</sup>

Under this Law, qualifying forest land is assessed for ad valorem taxation on the basis of its value for timber production, without regard to other uses. Following a 3-year phase-out period that ended in 1974, the timber in privately owned forests became exempt from ad valorem taxation and is now subject to a 6.5 percent excise (yield) tax at the time of harvest.

The State Department of Revenue (DOR) establishes criteria and rules for grading forest land on the basis of quality, accessibility, and topography. County assessors grade all forest lands within their jurisdictions according to such rules. The DOR annually determines values for each grade of forest land on the basis of sole use for timber growing and harvesting. These values are regarded as true and fair values by the assessor, who determines assessed value by applying the same assessment ratio that is used for other properties within the county.

Forest Land Designation

Forest lands that are in contiguous ownership of at least 20 acres and are primarily used for growing and harvesting trees may be classified for taxation under this law. Qualifying forest land is assessed accordingly even if its value for some other purpose is greater than its value as forest land. If the land value for other uses is not greater than its value for use as forest land, the owner is not required to apply for designation as forest land; the assessor will classify it as such. However, if the land has a value in another use that is greater than its value as forest land, the owner must file an application with the county assessor for classification and taxation under this law.

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15-17 or 18-19, respectively, of the Manual of the State Land Evaluation Advisory Committee, 1976. For 1977 suggested use values for open space and agricultural land, see pages 33-35 and iii-25, respectively, of the Procedures for Determining Ranges of the Values, with 1977 Suggested Use-Values, 1976.

<sup>42</sup>Washington Department of Revenue. 1976. Rules for Taxation of Timber and Forest Lands: Washington Administrative Code, Chapter 458-40.

### Forest Land Grading and Valuation

Assessors grade forest lands in accordance with rules prepared by the DOR. Lands are graded as "good", "average", or "poor" quality (tables 27 and 28). They are also graded for accessibility and typography as "favorable", "average", "difficult", or "inoperable", according to distance from a useable road, distance from a market for logs, and the topographical characteristics of the land (tables 29 and 30). Assessors then value the forest lands in accordance with the schedule of values prepared by the DOR (tables 31, 32, and 33).

### Compensation Tax Liability

If the designation is removed upon the request of the owner or the assessor, a compensating tax is imposed. This tax is equal to the difference between the tax last levied on the land as forest and an amount equal to the new assessed valuation of such land, multiplied by the number of years it was designated as forest land, but in no event greater than 10 years.

The compensating tax is not imposed if the removal of designation resulted solely from (a) the transfer to a government entity in exchange for other forest land in the State, (b) a taking through the exercise of eminent domain, or sale or transfer to an entity having the power of eminent domain, or (c) sale or transfer of land within 2 years after the death of an owner of at least 50 percent interest in the land.

### Derivation of Forest Land Values<sup>43</sup>

Since enactment of the 1971 law the DOR has analyzed forest land sales data to determine the average market value of bare forest land in eastern and western Washington. The market approach to forest land valuation is difficult because the amount of bare land exchanged in the market is almost non-existent. Consequently, the Department is forced to include forest land sales in the analysis which include varying amounts of merchantable and immature trees. The analytical problem then is to determine the average market value of the bare land in a sample of sales in which the purchase prices reflect the market value of land and trees together.

For several years the DOR used an analytical method termed abstraction to determine the value of bare land from the sales data. In 1975, this method was criticized for being too subjective, and the DOR began to explore other methods of analyzing the sales data. Critics suggested that a statistical approach termed multiple regression analysis could be used to determine the bare land component of value from the sales with

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<sup>43</sup>Department of Revenue, State of Washington, Olympia, Washington. October 30, 1978. Personal correspondence.

Table 27.--Forest land quality classification for Ponderosa pine and Douglas-fir stands in eastern Washington<sup>1</sup>

Forest land quality class	Age of trees (years)	Average height of dominant and codominant trees		General description
		Ponderosa pine <sup>2</sup>	Douglas- fir <sup>3</sup>	
- - - - - feet - - - - -				
Good	10	8 and over	10 and over	This class of forest land is rare in eastern Washington; consists of moist flats, bottom land and coves with deep soil.
	20	25 and over	45 and over	
	30	35 and over	80 and over	
	40	50 and over	100 and over	
	50	60 and over	120 and over	
	60	70 and over	130 and over	
	70	80 and over	145 and over	
	80	90 and over	155 and over	
	90	100 and over	165 and over	
	100	105 and over	175 and over	
Old growth		150 and over	200 and over	Use this class when 60% or more of the tract meets specifications and most of remainder is in Average class.
Average	10	4 to 8	5 to 10	
	20	15 to 25	30 to 45	
	30	25 to 35	50 to 80	
	40	35 to 50	65 to 100	
	50	40 to 60	75 to 120	
	60	50 to 70	85 to 130	
	70	55 to 80	95 to 145	
	80	60 to 90	100 to 155	
	90	65 to 100	105 to 165	
	100	70 to 105	110 to 170	
Old growth		100 to 150	150 to 200	Includes lower slopes, flats and coves with moderate to good soils and moisture conditions.
Poor	10	Under 4	Under 5	
	20	Under 15	Under 30	
	30	Under 25	Under 50	
	40	Under 35	Under 65	
	50	Under 40	Under 75	
	60	Under 50	Under 85	
	70	Under 55	Under 95	
	80	Under 60	Under 100	
	90	Under 65	Under 105	
	100	Under 70	Under 110	
Old growth		Under 100	Under 150	Use this class when 50% or more of the tract meets these specifications.

<sup>1</sup>Includes all private land east of the summit of the Cascade Range.

<sup>2</sup>USDA Forest Service. 1949. Technical Bulletin No. 630, October, 1938.

<sup>3</sup>USDA Forest Service. 1949. Technical Bulletin No. 201, table 1, p. 12.

Table 28.--Forest land quality classification for western hemlock and Douglas-fir stands in western Washington<sup>1</sup>

Forest land quality class	Age of trees (years)	Average height of dominant and codominant trees		General description
		All Douglas-fir types <sup>2</sup>	All hemlock types <sup>3</sup>	
- - - - - feet - - - - -				
Good	10	10 and over	10 and over	Usually consists of bottom lands, lower slopes and coves; deep, rich soil; moist condition.
	20	45 and over	35 and over	
	30	80 and over	65 and over	
	40	100 and over	90 and over	
Site index 170 and over	50	120 and over	110 and over	Use this class when 60% or more of the tract meets specifications and most of remainder is in Average Class.
	60	130 and over	125 and over	
	70	145 and over	140 and over	
	80	155 and over	150 and over	
	90	165 and over	160 and over	
	100	170 and over	170 and over	
	Old growth	225 and over	190 and over	
Average	10	5 to 10	5 to 10	Usually consists of middle and upper slopes. Medium to shallow soil. Moderate moisture condition.
	20	30 to 45	25 to 35	
	30	55 to 80	45 to 65	
	40	70 to 100	65 to 90	
Site index 120 to 170	50	80 to 120	75 to 110	Use this class when 60% or more of area meet class specifications.
	60	90 to 130	90 to 125	
	70	100 to 145	100 to 140	
	80	110 to 155	105 to 150	
	90	115 to 165	110 to 160	
	100	120 to 170	120 to 170	
	Old growth	150 to 225	125 to 190	
Poor	10	Under 5	Under 5	Consists of gravel flats, rocky slopes and shallow, poor soil types with dry moisture condition.
	20	Under 30	Under 25	
	30	Under 55	Under 45	
	40	Under 70	Under 65	
Under site index 120	50	Under 80	Under 75	Use this class when 50% or more of area meet class specifications.
	60	Under 90	Under 90	
	70	Under 100	Under 100	
	80	Under 110	Under 105	
	90	Under 115	Under 110	
	100	Under 120	Under 120	
	Old growth	Under 150	Under 125	

<sup>1</sup> Includes all private land west of the summit of the Cascade Range.

<sup>2</sup> USDA Forest Service. 1949. Technical Bulletin No. 201, table 1, p. 12.

<sup>3</sup> USDA Forest Service. 1962. Technical Bulletin No. 1273, table 1, p. 6.

Table 29.--Forest land access and topography classification for eastern and western Washington

Access and topography	Road development characteristics to tract	Topography of tract	Distance from log market <sup>1</sup>		Total grade in class <sup>2</sup>
			Eastern	Western	
<u>Grade 1</u>					
Favorable	Tract within 1 mile of usable road. Easy road construction. No rock outcrops or swamp barriers.	Flat to gentle slopes generally under 40 percent. No rock outcrops or swamps. Good tractor logging ground.	Less than 15 miles.	Less than 30 miles.	3 and 4
<u>Grade 2</u>					
Average	Tract within 3 miles of usable road. No difficult road problems. Average construction.	Variable slopes under 60%. Some rock outcrop or swampy ground. Average logging conditions.	15 to 50 miles.	35 to 45 miles.	5, 6 and 7
<u>Grade 3</u>					
Difficult	Tract over 3 miles from usable road. Also includes tracts closer to road, but with difficult construction problems such as rock or water barriers and rough terrain.	Rough, broken ground. Steep slopes. Numerous rock outcrops and bluffs or other features which would make logging difficult.	Over 50 miles.	Over 45 miles.	8 and 9
Inoperable	Extreme physical barriers prevent access. Legal barriers (rights-of-way, etc.). Area is within commercial forest zone, but too rocky, steep, or sterile to produce merchantable timber.				

<sup>1</sup>Eastern and western Washington are divided by the summit of the Cascade Range.

<sup>2</sup>Determined by adding any combination of rating of road development, topography on tract, and distance from log market.

Table 30.--Per-acre forest land values in eastern and western Washington, 1977<sup>1</sup>

Land quality class	Accessibility and topography	Western Washington	Eastern Washington
- - - - - dollars - - - - -			
Good	Favorable	111	33
	Average	93	29
	Difficult	62	22
	Inoperable	5	1
Average	Favorable	79	20
	Average	66	17
	Difficult	43	13
	Inoperable	3	1
Poor	Favorable	44	9
	Average	37	8
	Difficult	24	6
	Inoperable	1	1

<sup>1</sup>Eastern and western Washington are divided by the summit of the Cascade Range.

Table 31.--Stocking classes by proportion of area covered by growing trees

	Stocking class or density		
	Good	Medium	Poor
- - - - - percent - - - - -			
Area covered by growing trees	69-100	40-69	10-39

Table 32.--Stocking classes by number of trees per acre, by size class

Size class	Stocking class or density		
	Good	Medium	Poor
Number of trees per acre			
Seedling-sapling, 0-5 inches @ 4 1/2 feet	1400+	800-1,400	200-800
Pole timber, 5-11 inches @ 4 1/2 feet	100-330	60-325	25-225
Small saw timber, 11-15 inches @ 4 1/2 feet	50-175	30-170	15-85
Large saw timber, 15 inches + @ 4 1/2 feet	60-80	35-65	10-35

Table 33.--Volume per acre by stand size and stocking class

Size class	Diameter range	Volume range	Stocking					
			Good			Medium		
			Inches	bd. ft.	Cords	bd. ft.	Cords	bd. ft.
Seedlings	0-1	0	0	0	0	0	0	0
	Low	0	0	0	0	0	0	0
Saplings	1-5	Average	0	2.5	0	2.2	0	1.5
	High	0	2.9	0	2.8	0	2.0	
Pole timber	5-9	Low	700	13.0	500	7.0	200	3.0
	Average	1,400	20.0	1,000	12.1	990	5.2	
	High	1,500	24.0	1,500	12.9	1,200	7.0	
Small saw timber	9-15	Low	6,000	18.0	3,000	13.0	1,500	5.0
	Average	7,700	22.9	4,950	17.6	2,800	10.9	
	High	10,000	26.0	6,000	20.0	3,000	13.0	
Large saw timber	15-	Low	10,000	24.0	5,000	17.0	1,500	6.0
	Average	14,850	33.5	8,100	21.2	4,140	12.1	
	High	18,000	40.0	10,000	26.0	5,000	16.0	

Table compiled by Paul C. Gullkey, Research Forester, USDA Forest Service

much more meaningful results. Using regression analysis to analyze the data, the DOR found that the estimated bare land values were consistently about double the values produced by abstraction for western Washington and three times as high for eastern Washington.

Following the recommendation of a technical committee appointed by the Director of Revenue, the DOR employed both the abstraction and regression methods for 1977 valuations, giving the heavier weight to the abstraction method. This decision resulted in a law suit challenging the Department's land values for 1977. The petitioners argued that the DOR values for 1977 were too high because of the use of an "invalid" valuation technique--multiple regression--and they asked the court to strike down the 1977 values. In addition, King County, one of the State's major timber counties, also entered the suit against the DOR, arguing that the 1977 values were too low and that the Department should have adopted the regression estimates of value. A Superior Court judge ruled that the DOR's 1977 forest land values were invalid and ordered the Department to revise them. Finally, in October 1978, the court agreed to accept the original 1977 abstraction results, and the case was settled pending possible appeal by King County.

The DOR will seek legislation to amend the forest tax law to include bare land values. These values could be subject to a periodic adjustment; the adjustment procedure should also be clearly spelled out in law.

#### Other Tax Laws Affecting Forest Properties

##### Open Space Taxation Act<sup>44</sup>

Qualifying agricultural, forest, or open space land classified under this Act is assessed for taxation on the basis of its value in current use, without consideration of its potential value in more intensive uses. To qualify for assessment under this Act (see WAC 458-30-010), the landowner or contract purchaser must apply for such assessment and agree to maintain the property in its current use for at least 10 years.

The assessor determines the value of agricultural land according to the procedures outlined below. Forest and open space lands are assessed on their value in current use, provided that the assessed value of open space land shall not be less than that for agricultural uses.

A land capability classification system is used as a guide for determining the productivity capacity of agricultural lands. Soils are classified into five capability classes based on their potential to produce crops most typically grown in the area. Crop production is averaged over a 5-year period.

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<sup>44</sup>Chapter 212, Laws of 1973, 1st Ex. Sess., RCW 84.34, and WAC 458-30.

Class I.--Soils have few limitations that restrict their use.

Class II.--Soils have some limitations that reduce the choice of plants or require moderate conservation practices.

Class III.--Soils have severe limitations that reduce the choice of plants or require special conservation practices, or both.

Class IV.--Soils have very severe limitations that restrict the choice of plants, require very careful management, or both.

Class V.--Soils are limited in use and generally are not suited to cultivation.

The DOR uses the soil classifications established by the Soil Conservation Service. Where agricultural lands have not been classified by the Soil Conservation Service, the assessor uses all available information to determine the soil classification of the land. If the information is insufficient to determine the property classification, the basis for valuing agricultural lands shall be on an acre-unit value, using valuation procedures as provided in RCW 84.34 and the rules discussed in the five preceding paragraphs.

To determine the current use value of farm and agricultural land and the current use value of open space land with no current use, the assessor values each class of soil by the capitalization of income method as follows:

1. The Net Cash Rental to be capitalized shall be determined as follows:

- A. Where sufficient rental information is available, the income is the average annual rental paid on lands of similar soil classes available for lease for a period of at least 3 years in the area. Credit is allowed for those production costs customarily paid by the landlord.
- B. Where sufficient rental information is not available, the net cash rental is the cash value of typical or usual crops on land of similar quality averaged over 5 years, less standard cost of production.
- C. Where the land being valued is not capable of producing agricultural income or is not being used to produce agricultural income or where sufficient information is not available by which agricultural income can be determined, the assessor imputes, on the estimated capability of the land, a reasonable amount to be capitalized as income.

2. The capitalization rate used in valuation is the sum of the following:

A. An interest component to be determined by the DOR and certified to the county assessor on or before January 1 of each year. It is comparable to interest rate charges on long-term loans secured by mortgages on farms or agricultural lands averaged over the last 5 years plus,

B. A component for property taxes, which is a percentage equal to the average tax rate times the legal assessment ratio within the county.

3. The value of the agricultural land shall be the net cash rental of the land divided by the capitalization rate determined in subsection 2.

4. The DOR's determination of the interest rate established in 2A may be appealed to the State Board of Tax Appeals by any owner of farm or agricultural land or the assessor of any county containing farm and agricultural land.

5. Land which is being used as a building site and improvements upon such land shall be valued at current use market value.

Reforestation Act<sup>45</sup>

Under this law, qualifying forest lands are taxed annually on assessed values of \$16 per acre in western Washington and \$8 per acre in the eastern portion of the State. The timber on the land is subject to a yield tax of 12.5 percent at the time of harvest.

The 1971 Forest Tax Law placed a moratorium on further classification of land under this law, and directed the Forest Tax Committee to recommend a method of integrating lands previously classified under the Reforestation Act into the new Forest Tax Law system.

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<sup>45</sup>Revised Code, Secs. 84.28.

WEST VIRGINIA<sup>46</sup>

Forest lands are assessed and taxed as real estate. The timber on these lands is considered together with other indicia of value in determining assessments.

Standing timber is to be valued at its true value per thousand board feet. All timberland is considered commercial if production will meet or exceed 3,000 board feet per acre, measuring 12 inches or more at a point 12 inches above the ground on the high side of the tree. Managers of timberland operations should submit annual depletion reports to the assessor by July 1 of each year so that assessments may be adjusted to reflect depletion.

The quarterly stumpage report prepared by the West Virginia Department of Natural Resources is a useful tool available to the assessor for determining true value of standing timber. It lists sales of timber by county, volume, gross sale price and price per thousand board feet for each of the six forest districts. The stumpage report also separates out special product sales (e.g., walnut) and pulpwood sales.

## WISCONSIN

Real property is valued for taxation purposes at its full value,<sup>47</sup> i.e., the price which could ordinarily be obtained at a private sale. The net value of forest property is equal to the combined values of the bare land and the timber thereon. General tax law requires that the value of forest property be determined according to the procedures outlined in the Wisconsin Property Assessment Manual, Volume 1, Chapter 11; applicable portions are provided on the following pages.

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<sup>46</sup> West Virginia Assessor's Manual, State Tax Commissioner's Office.

<sup>47</sup> Wisconsin Statutes, Annotated, Sec. 70.32.

Two special tax laws, the Private Forest Crop Law and the Woodland Tax Law, permit the owners of qualifying forest lands to pay a uniform fee in lieu of the ad valorem property tax.<sup>48</sup> However, the lands classified under these laws are also valued each year according to the same procedures as other forest lands, and appraisal results are recorded on the assessment rolls. If lands taxed under the special tax laws are withdrawn from special designation, the difference in the actual tax paid and the tax that would have been due is calculated and becomes due.

Forest land falls within the classification of Residual Lands. Included are Productive Forest Land (Class F1), Non-productive Forest Land (Class F2), and Swamp or Waste Land (Class E).

Productive Forest Land (F1) is defined as land which is producing or is capable of producing commercial forest products and is not otherwise classified. Non-productive Forest Land (F2) includes land which, because of soil or site conditions, is not producing or is not capable of producing commercial forest products and which is not otherwise classified. Swamp or Waste Land (E) is defined to include bog, marsh, low-land brush, or other non-productive lands not otherwise classified.

#### Assessment of Forest Lands

The greatest portion of Wisconsin forest acreage falls within the productive classification (F1). In isolated areas, particularly in the far northern counties, where site quality and local topography make the growing and harvesting of forest products unprofitable, the assessor should regard such acreage as non-productive (F2) and adjust the values accordingly.

The assessment of forest lands requires as much care and knowledge as do the other classes of property. To cope with this challenge, assessors should have or acquire a knowledge of tree species and the kinds of forest products harvested in their taxing jurisdictions. The amount of forest products on a given description can only be ascertained through inspection by the assessor or from accurate cruise reports. When such cruise reports are not available, the assessor should resort to volume tables to estimate the number of board feet of saw logs or cords of pulpwood and other products on a given description. Stumpage values are available each year from the Supervisor of Assessment or any Department of Natural Resources (DNR) district office. This information is compiled by the DNR and University Extension Service. Such pricing guides, with necessary area adjustments for transportation and other unusual factors, are reliable guides for establishing the market value of forest land.

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<sup>48</sup>Special forest property tax laws are discussed in Chapter 13 of the Wisconsin Property Assessment Manual, Vol. I.

The first step in valuing forest land is to estimate the value of the bare land. This value is best found by analyzing sales of recently clear-cut or cutover land sold for forest plantation purposes. Lands purchased for recreational or scenic purposes introduce an additional dimension of value which must eventually be recognized, but which is best not considered reliable as a basis for estimating bare land value.

The second step is to estimate the stumpage value of the timber. The assessor will need to know (1) the kind and amount of merchantable forest products found on the land and (2) the respective unit market prices of the forest products. Number (1) is most accurately determined from reports of skilled timber cruisers. Satisfactory results have also been obtained through the interpretation of special aerial photography by highly skilled specialists. Lacking this information, the assessor's next best alternative is to establish the kinds of forest products by visual inspection and to estimate the amount by making use of a volume table.

#### Use of Volume Tables

To use volume tables the assessor must first establish the class of "stocking" or tree stem density. Because growth does not always uniformly cover the area of land and because "stocking" also depends on the size and diameter of the trees, the following tables will help guide the assessor.<sup>49</sup>

View or sample several areas within a 40-acre tract to determine whether the stand is uniform. If the stand is not uniform, an average estimate for the entire tract can be made by an actual count of trees within several circles with a radius of 1 rod (16 1/2 feet). A count within such a circle multiplied by 50 will provide an estimate of size and stocking per acre. The average of several counts within test circles strategically selected will provide an average estimate for the tract.

A faster method than the one described above for obtaining the information on volume of growing forest products on a given description is the Bitterlich System. It is referred to as the point sampling method of measuring basal area. Further information on the use of point sampling for timber cruising may be obtained from technical bulletins provided by the DNR.<sup>50</sup>

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<sup>49</sup>Chapter 11 of the Assessment Manual also includes pictorial illustrations of good, medium, and poor stocking classes for four categories of tree size, for both hardwood and conifer stands.

<sup>50</sup>Department of Natural Resources. 1970. Basal area and point-sampling: Interpretation and application. Tech. Bull. No. 23 (Rev.) Madison, Wis. 52 pp.

After the size class (diameter range) and the stocking class have been established, the number of board feet or cords of the various forest products can be read from the volume table. The column headed "Volume range" provides for the variation of tree height and tree diameter within each size class. This variation also accounts for the great degree of overlapping in the number of trees per acre in the pole timber and small sawtimber size class in table 32. Generally, if the average diameter of the tree trunks (measured at d.b.h.) is at the lower end of the diameter range, the low volume line should be used in the volume table. The height of the tree also affects the volume range, and only experience will sharpen the assessor's judgement in this respect.

As a further guide to the assessor, note that except for Menomonee County, there is a small amount of large sawtimber found in Wisconsin.

The number of cords or board feet of each forest product multiplied by the unit stumpage values yields the additional value that must be added to the bare land value.

The accompanying appraisal illustrations are given to suggest a practical way to summarize the field appraisal of a forty acre description. All the basic information is shown and may be set up in such a manner as to provide a permanent assessment record.

#### Appraisal Illustrations<sup>51</sup>

40 acres	Value of land: 40 acres at \$3 =	\$ 120
Aspen	Value of forest products:	
5-9 inches	40 acres at 13 cords/acre =	
Medium stocking	520 cords.	
High volume	520 cords at \$2.40 =	<u>1,040</u>
	Value of forest land ( $F_2$ ) =	<u>\$1,160</u>
30 acres	Value of land: 40 acres at \$5 =	\$ 200
Norway pine	Value of forest products:	
9-15 inches	<u>Norway pine:</u>	
Medium stocking	30 acres at 3,000 board feet =	
Low volume	90,000 board feet.	
10 acres	90,000 board feet at \$20 =	1,800
White pine	<u>White pine:</u>	
9-15 inches	10 acres at 1,500 board feet =	
Poor stocking	15,000 board feet.	
Low volume	15,000 board feet at \$22 =	<u>330</u>
	Value of forest land ( $F_2$ ) =	<u>\$2,330</u>

<sup>51</sup>The values and unit prices shown are for illustration only and are not meant to be a standard or average value.

40 acres	Value of land: 40 acres at \$4 =	\$ 160
Aspen	Value of forest products:	
1-5 inches	No merchantable products =	<u>None</u>
Good stocking	Value of forest land =	
Low volume		\$ 160

## WYOMING 52

Wyoming timberlands are valued the same as grazing lands for taxation purposes. The valuation depends upon the soil classification. The State has no special provision for the assessment of timberlands.

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<sup>52</sup>The Department of Revenue, Ad Valorem Tax Division. 1977. Personal correspondence.

